

FIG. 1

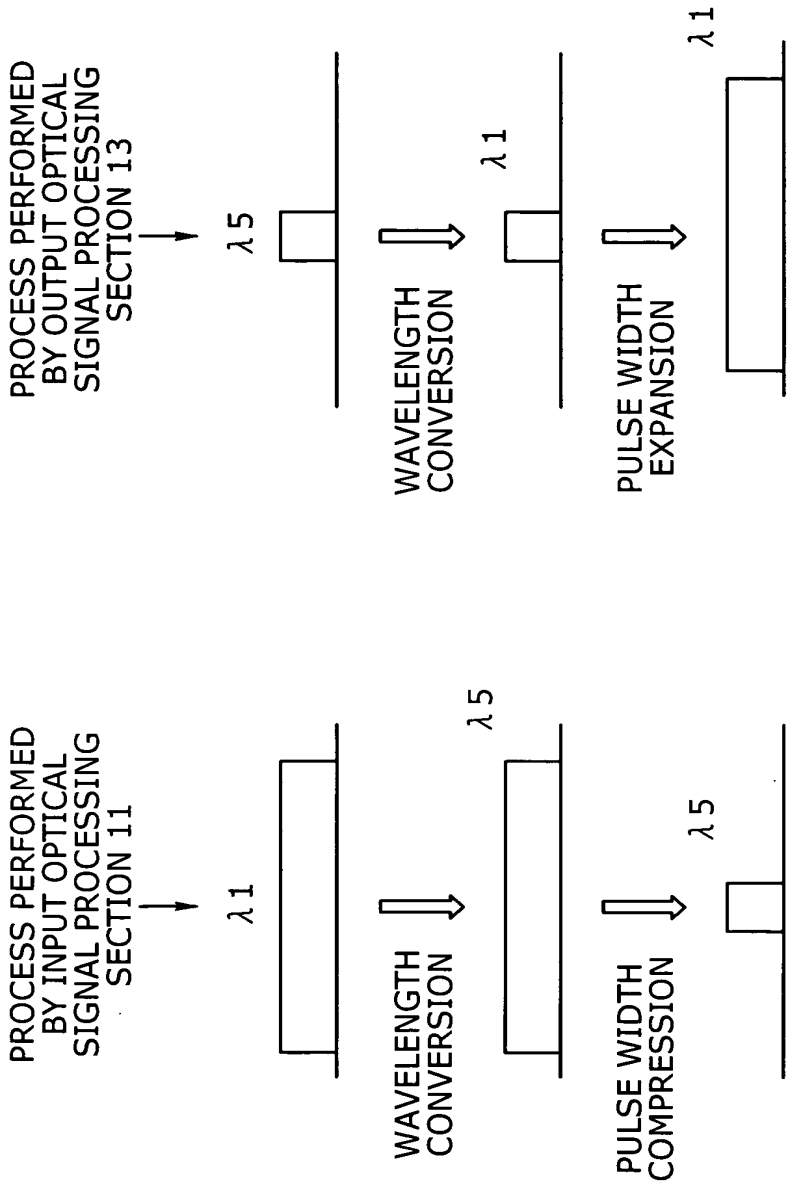


FIG. 2(A)

FIG. 2(B)

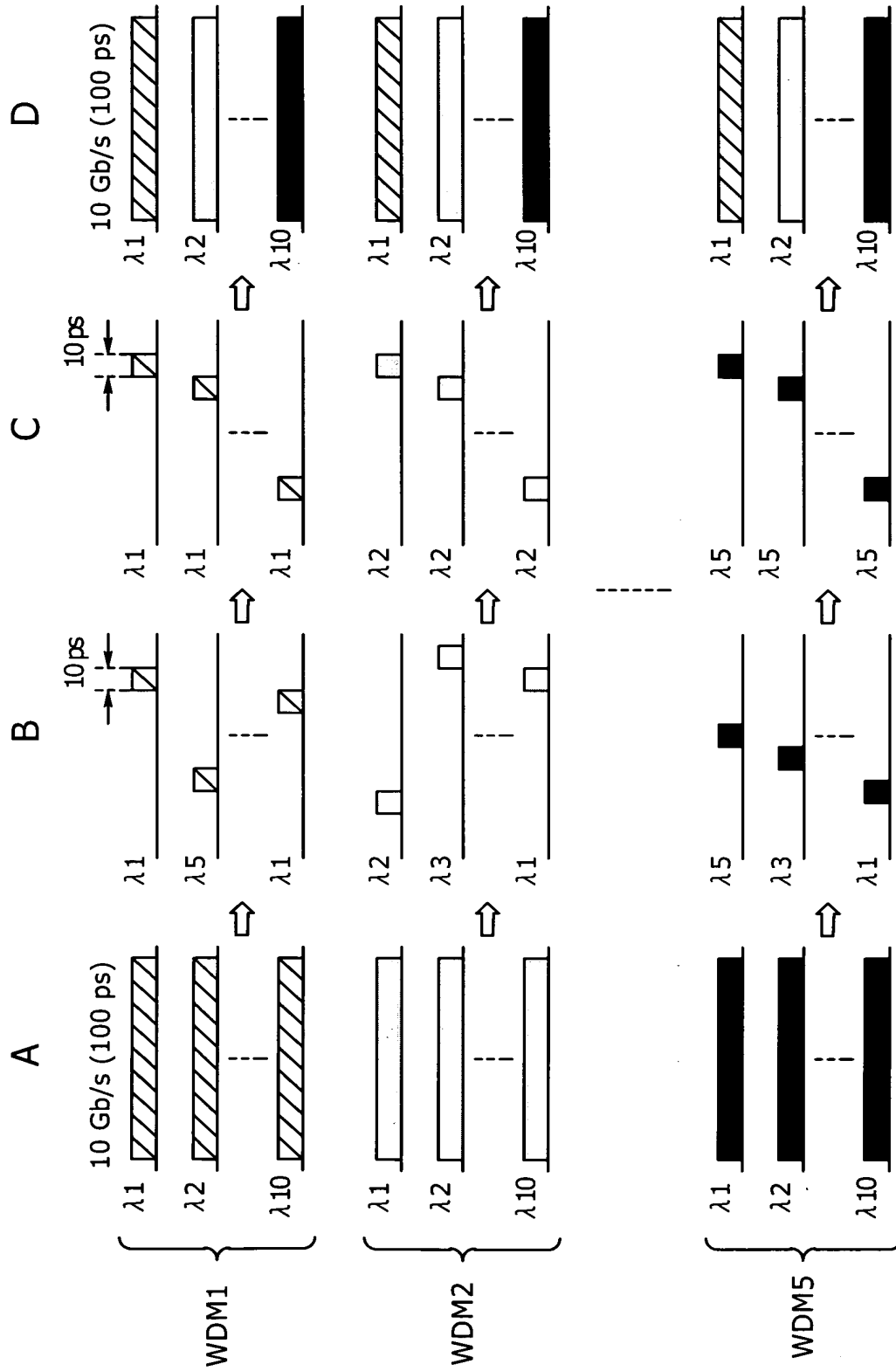


FIG. 3

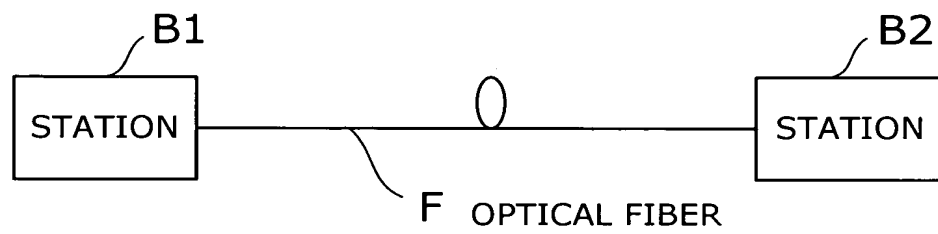


FIG. 4

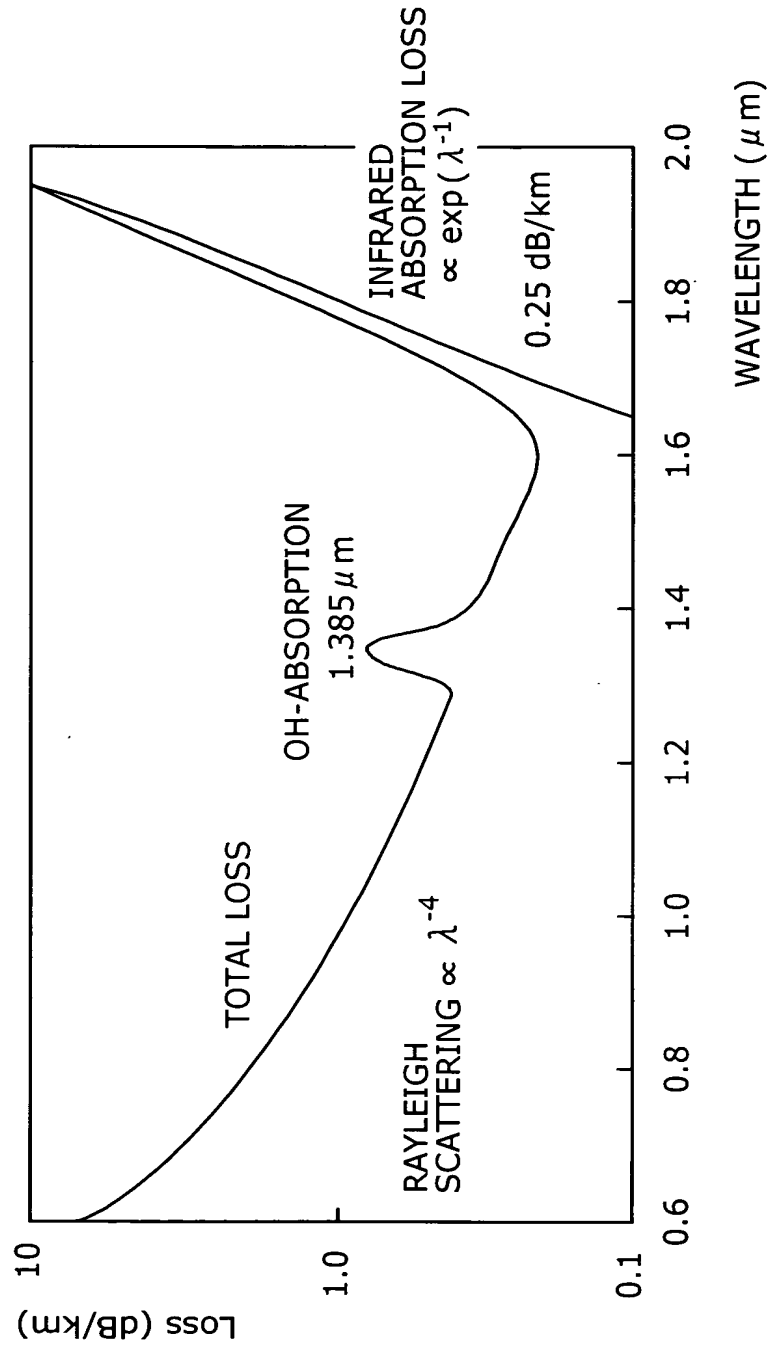
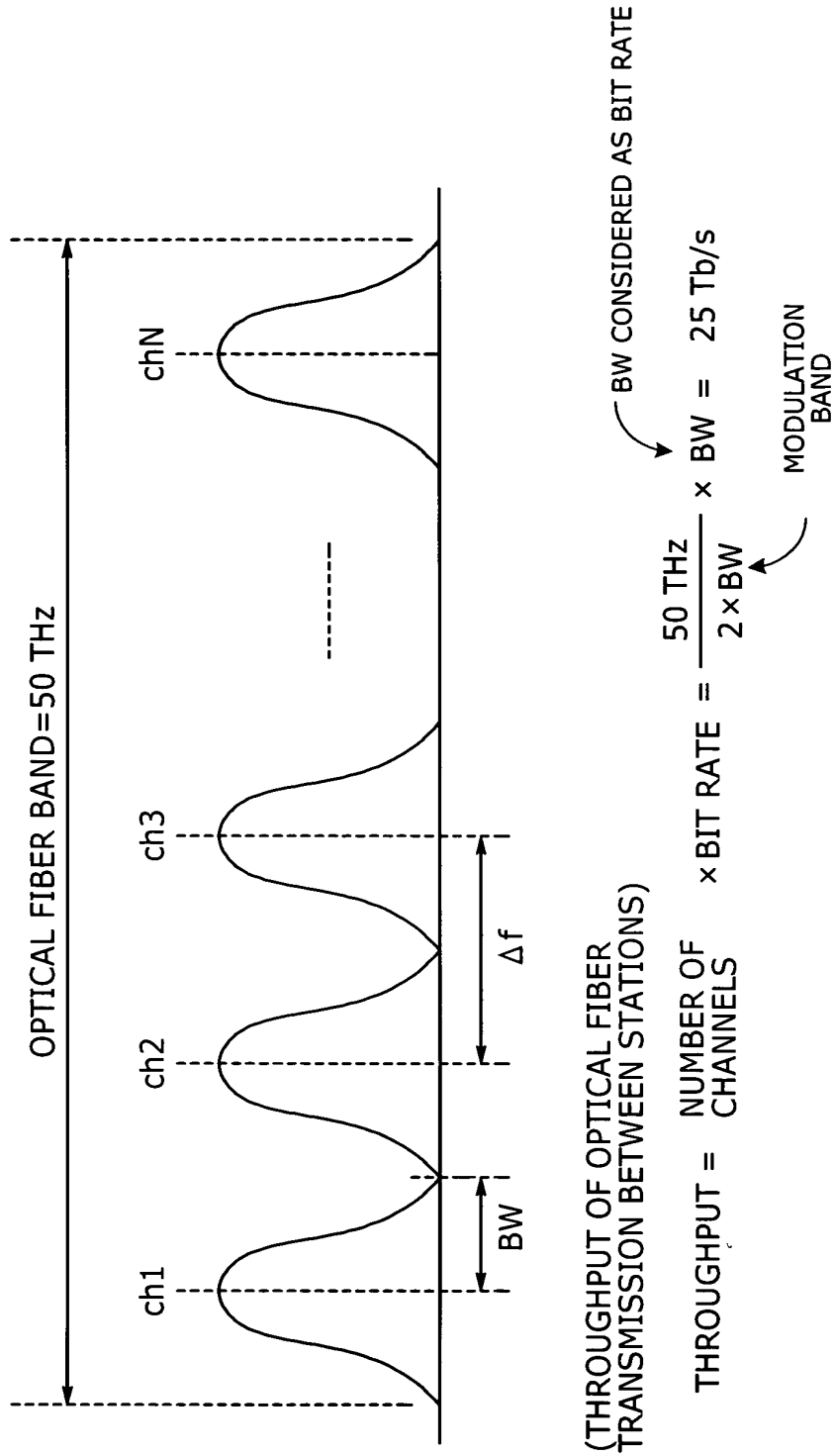


FIG. 5

BAND NAME	MEANING	WAVELENGTH RANGE
O BAND	Original	1260 nm to 1360 nm
E BAND	Extended	1360 nm to 1460 nm
S BAND	Short wavelength	1460 nm to 1530 nm
C BAND	Conventional	1530 nm to 1565 nm
L BAND	Long wavelength	1565 nm to 1625 nm
U BAND	Ultralong wavelength	1625 nm to 1675 nm

FIG. 6



A THROUGHPUT OF 25 TBITS/S IS A THEORETICAL UPPER LIMIT FOR AN OPTICAL FIBER BAND OF 50 THZ. WITH LONG-DISTANCE TRANSMISSION BY AN OPTICAL FIBER, HOWEVER, ACTUAL THROUGHPUT WILL BE CONSIDERABLY LOWER THAN 25 TBITS/S DUE TO THE NONLINEAR EFFECTS.

FIG. 7

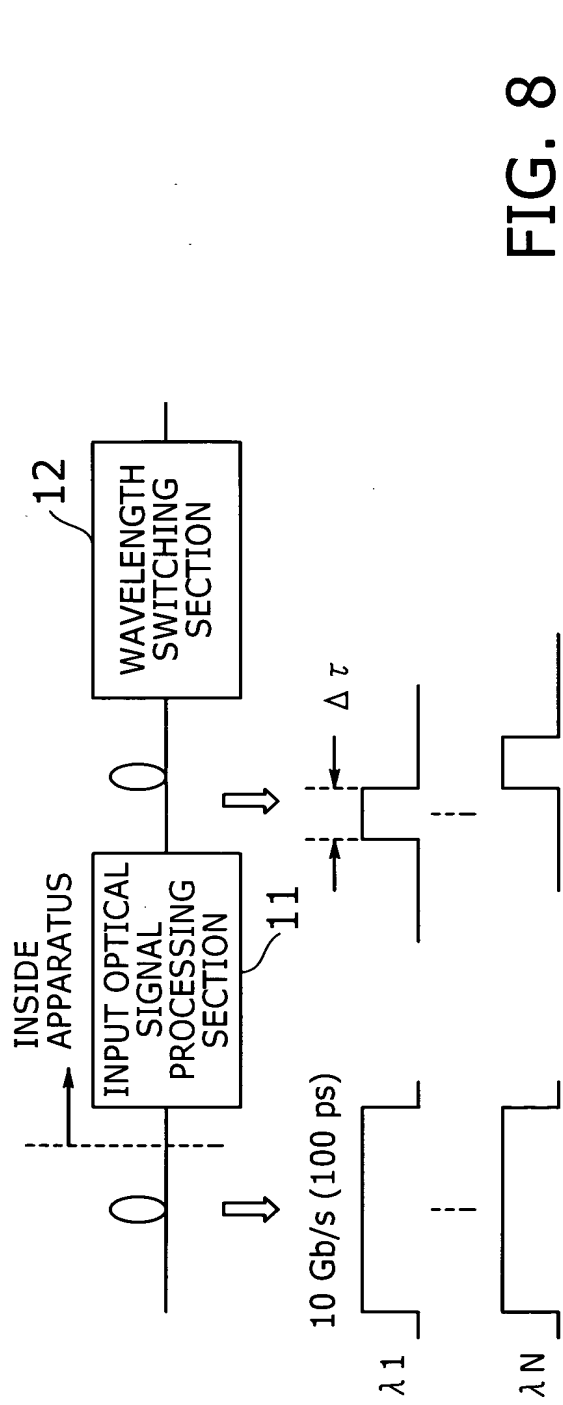


FIG. 8

(THROUGHPUT OF INTRA-APPARATUS OPTICAL FIBER TRANSMISSION)

$$\begin{aligned} \text{THROUGHPUT} &= \text{NUMBER OF COMPRESSED PULSES} \times \text{BIT RATE OF ONE COMPRESSED PULSE} \\ &= \frac{50 \text{ THz}}{2 \times \left( \frac{1}{\Delta \tau} \right)} \times \underbrace{\frac{100 \text{ ps}}{\Delta \tau}}_{\text{TIME DIVISION NUMBER}} \cdot 10 \text{ Gb/s} = 25 \text{ Tb/s} \\ &= \frac{\text{BW}_{\text{fiber}}}{2} \end{aligned}$$

UNLIKE THE OPTICAL FIBER TRANSMISSION BETWEEN STATIONS, THE INTRA-APPARATUS OPTICAL FIBER TRANSMISSION IS SHORT DISTANCE TRANSMISSION, SO THE NONLINEAR EFFECTS HAVE NO INFLUENCE. THEREFORE, A THROUGHPUT OF 25 TBITS/S, BEING A THEORETICAL UPPER LIMIT, CAN BE ACHIEVED.

THE THROUGHPUT OF THE INTRA-APPARATUS OPTICAL FIBER TRANSMISSION MAY BE CALCULATED BY MULTIPLYING (OPTICAL FIBER BAND) AND (1/2) TOGETHER.



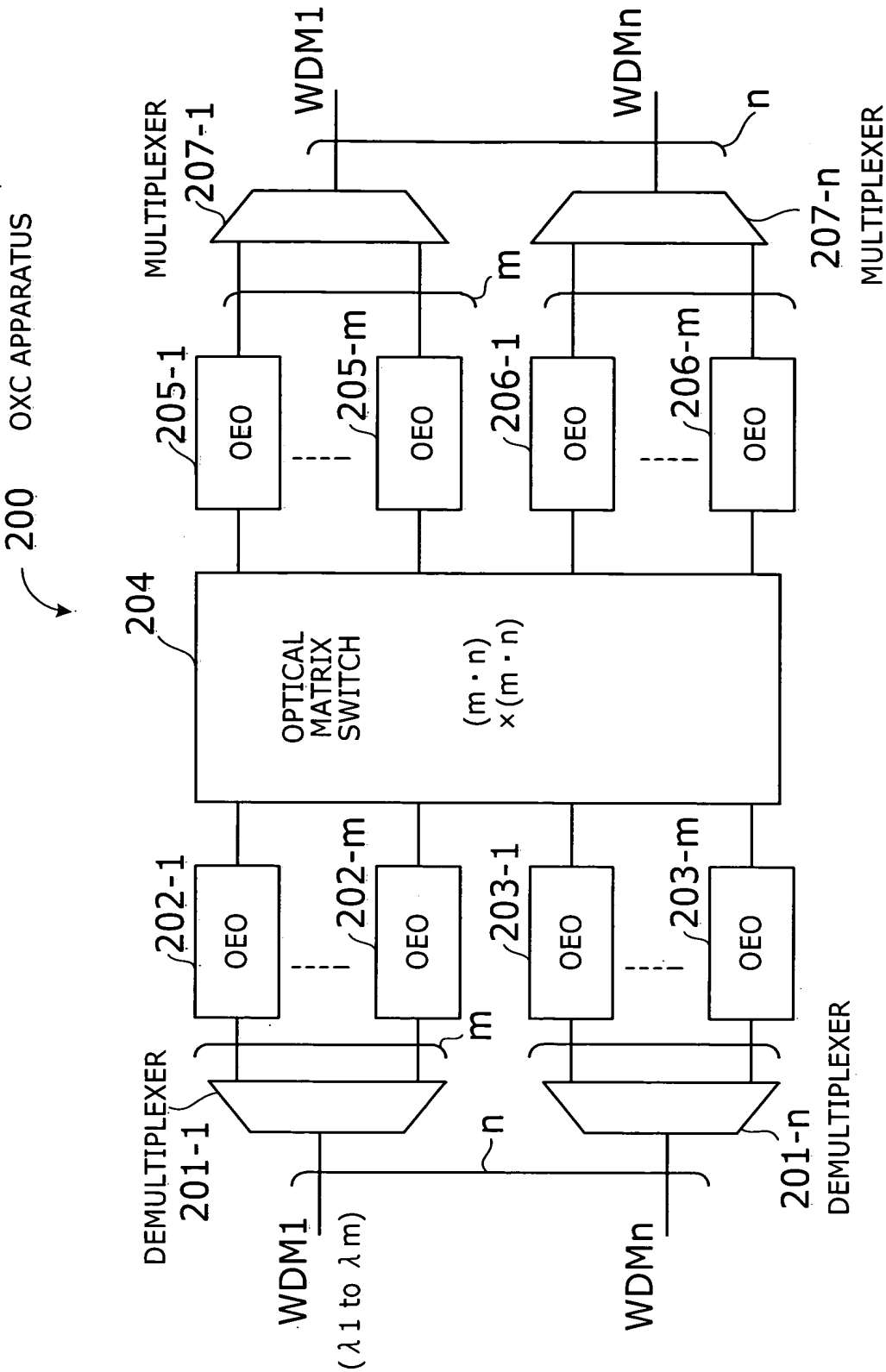


FIG. 9  
PRIOR ART

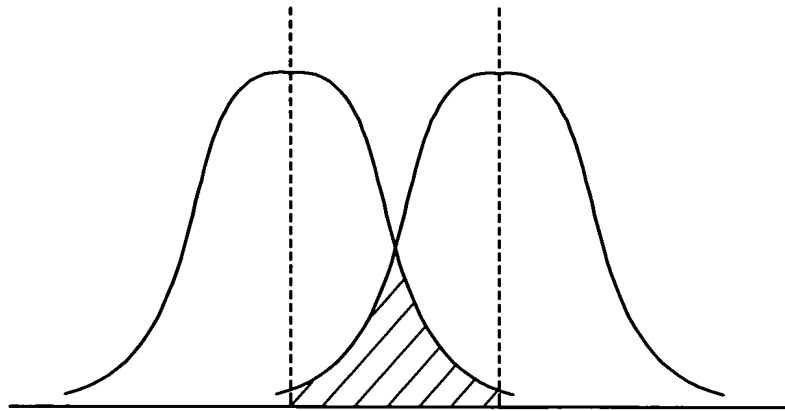


FIG. 10(A)

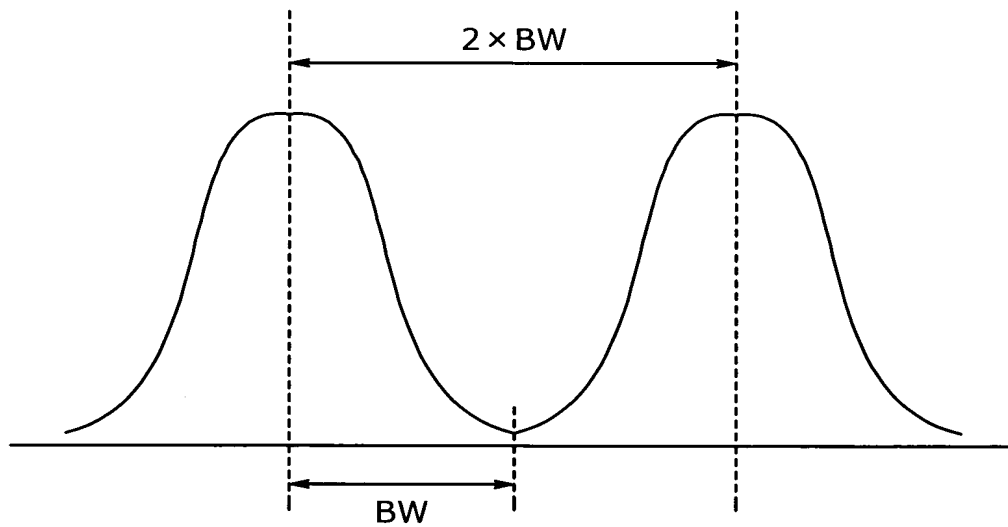


FIG. 10(B)

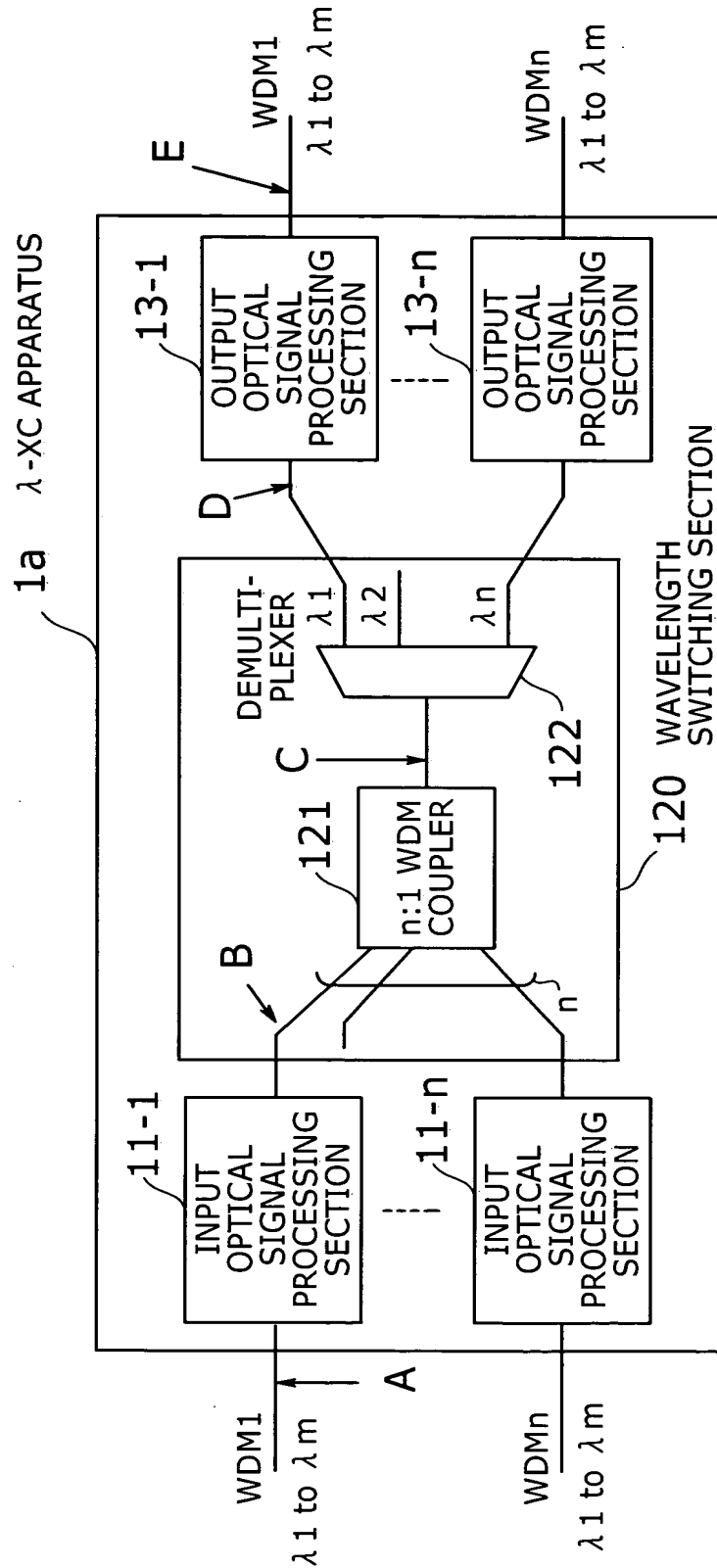


FIG. 11

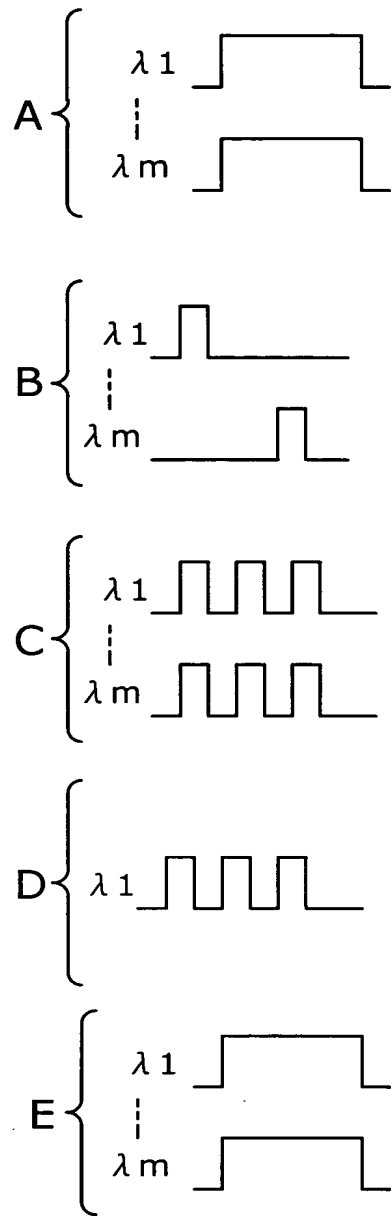


FIG. 12

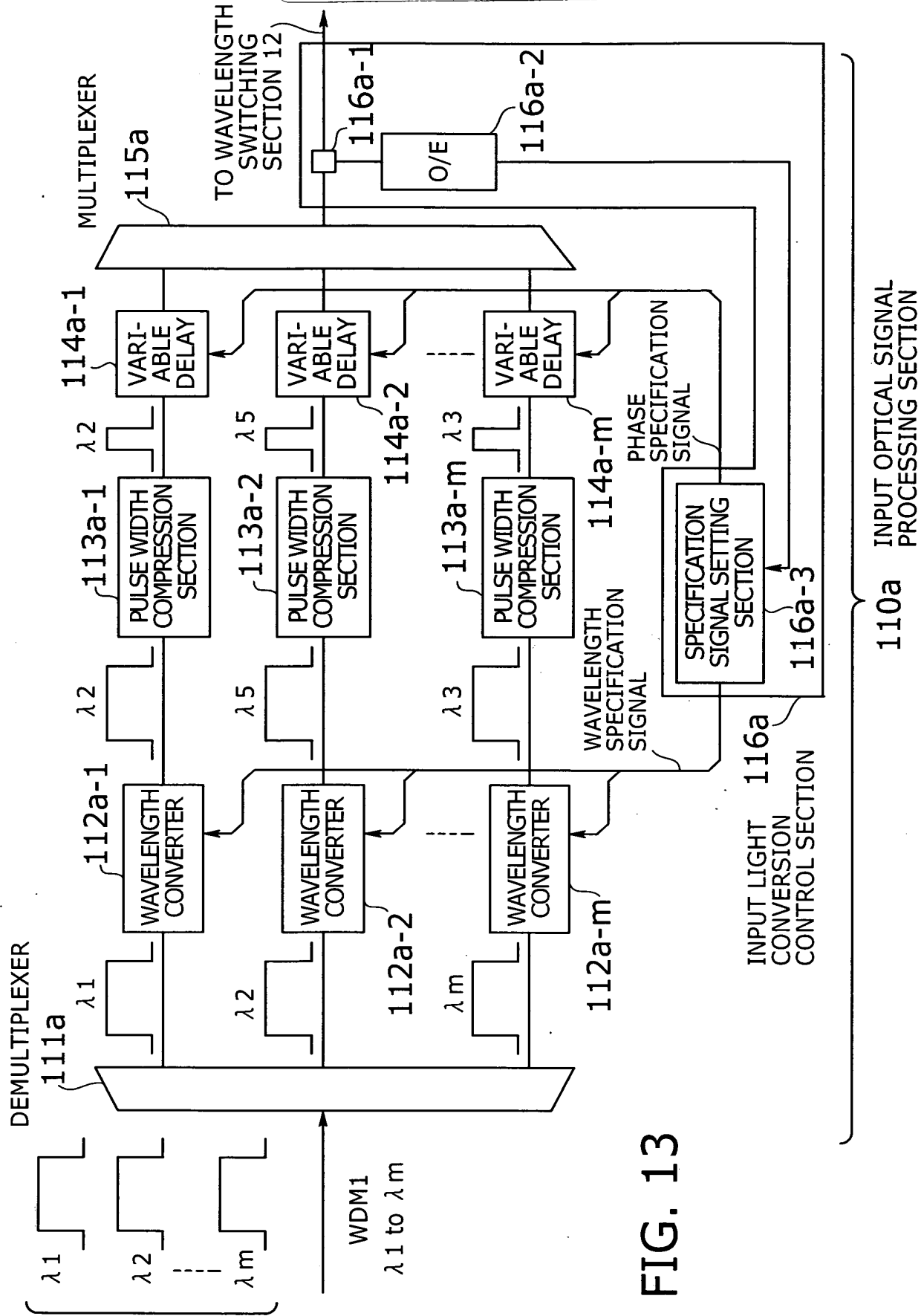


FIG. 13

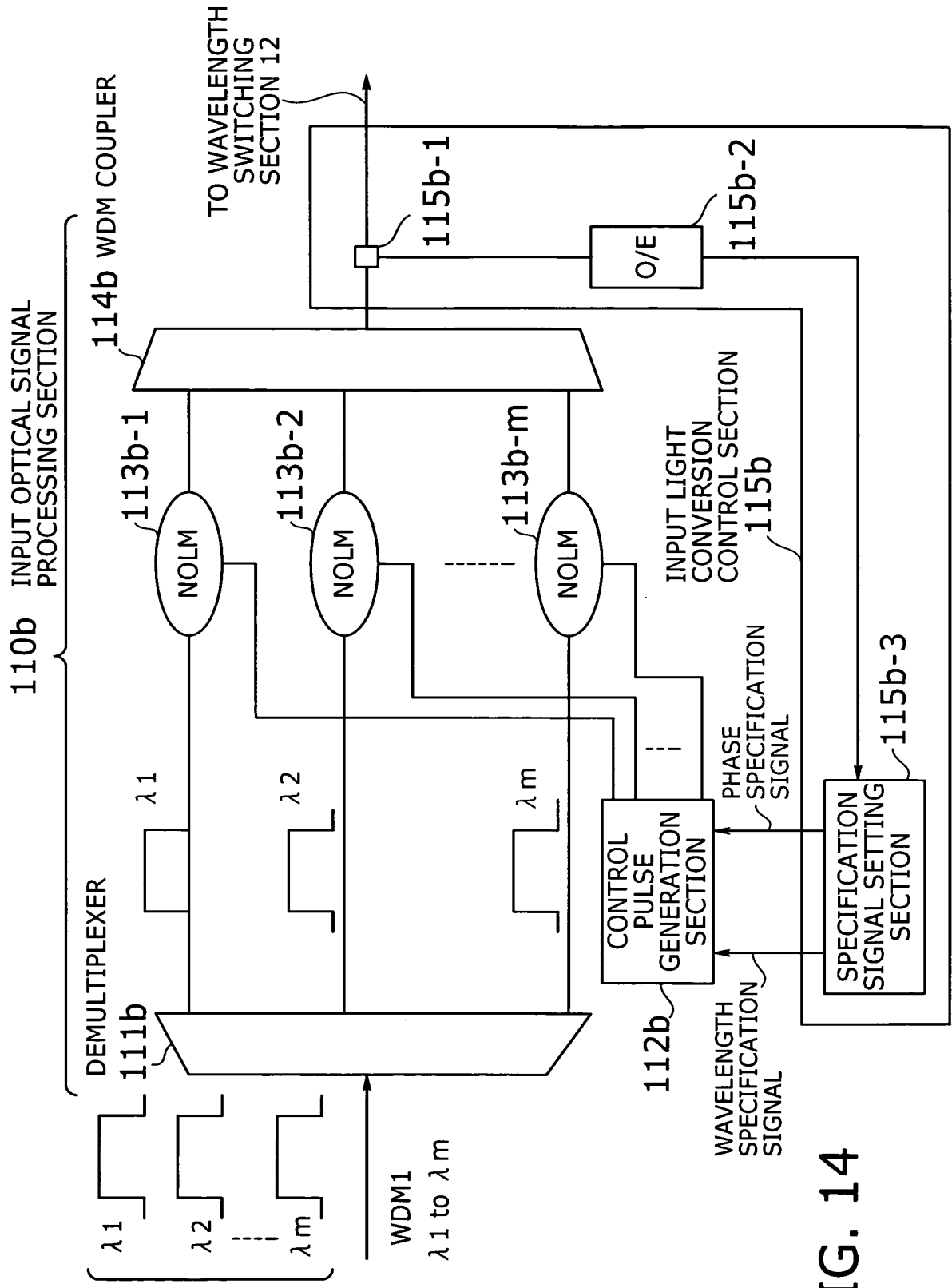


FIG. 14

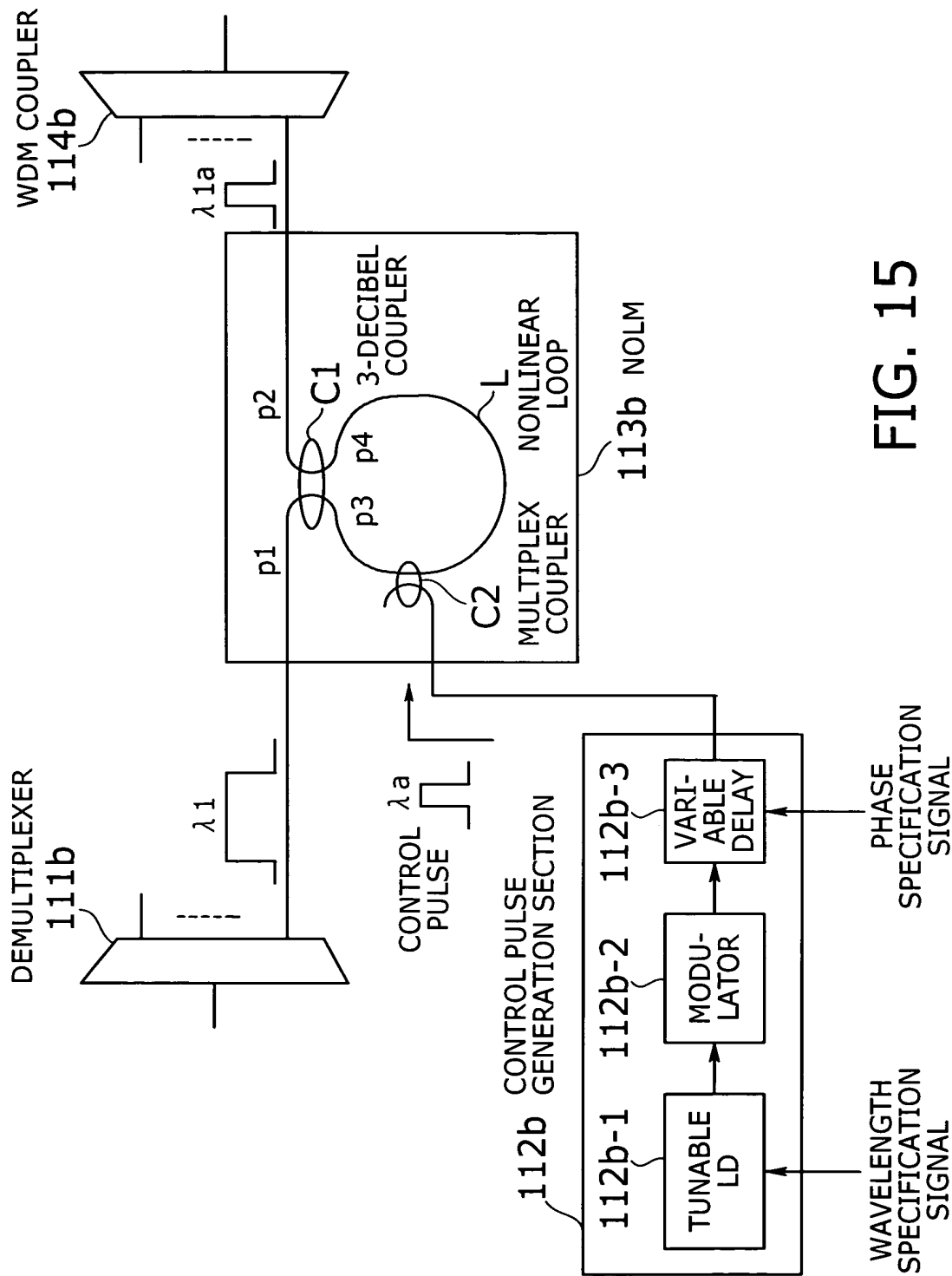


FIG. 15

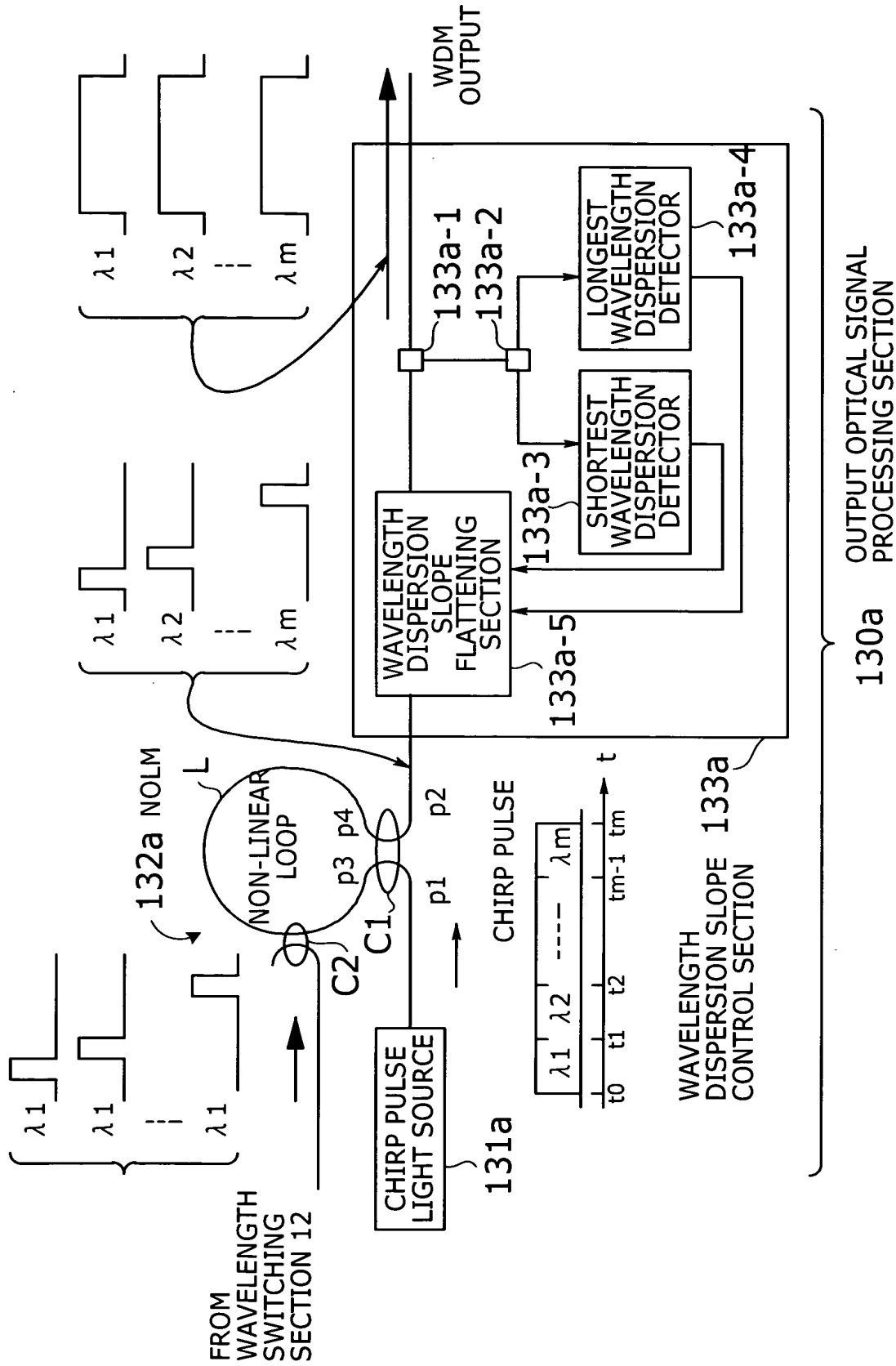
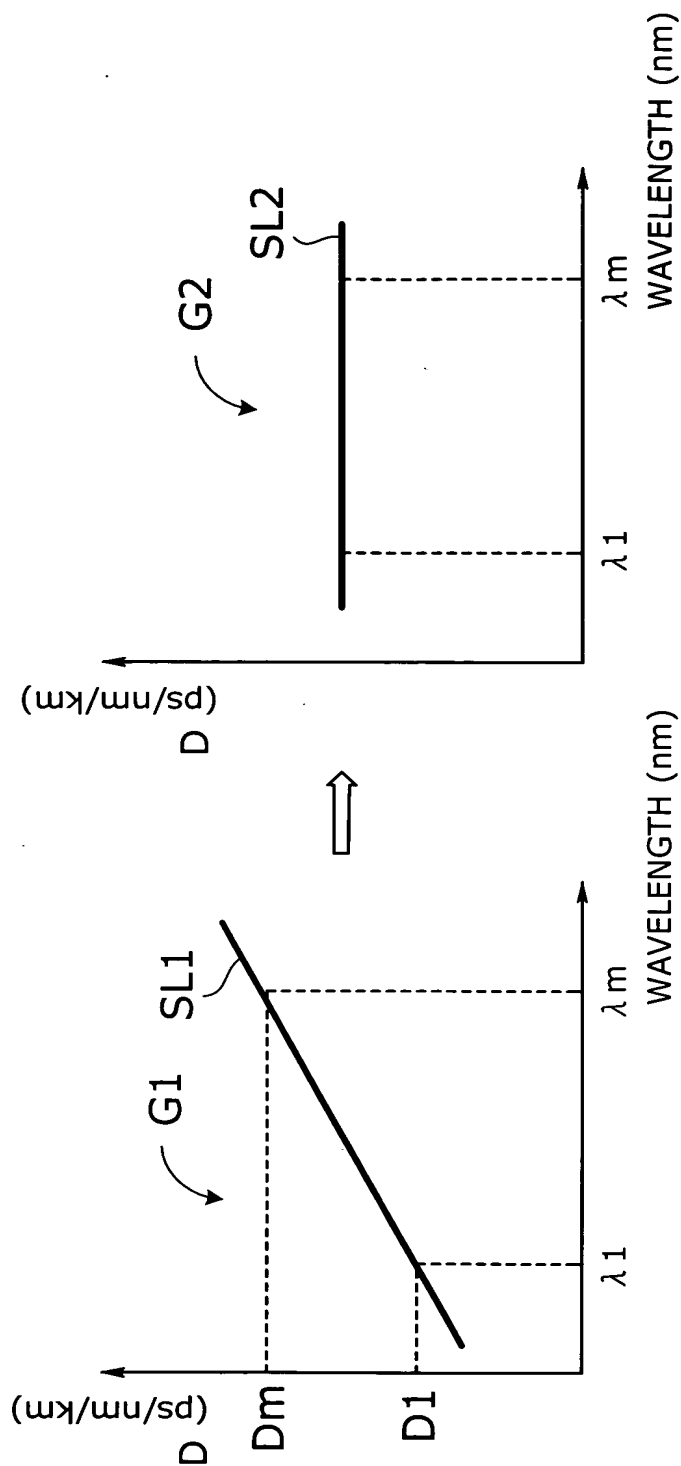


FIG. 16





BY FLATTENING A DISPERSION SLOPE BETWEEN  $\lambda 1$  AND  $\lambda m$ , THE PULSE WIDTHS OF THE  $\lambda 1$  THROUGH  $\lambda m$  SIGNALS ARE EXPANDED EQUALLY.

FIG. 17

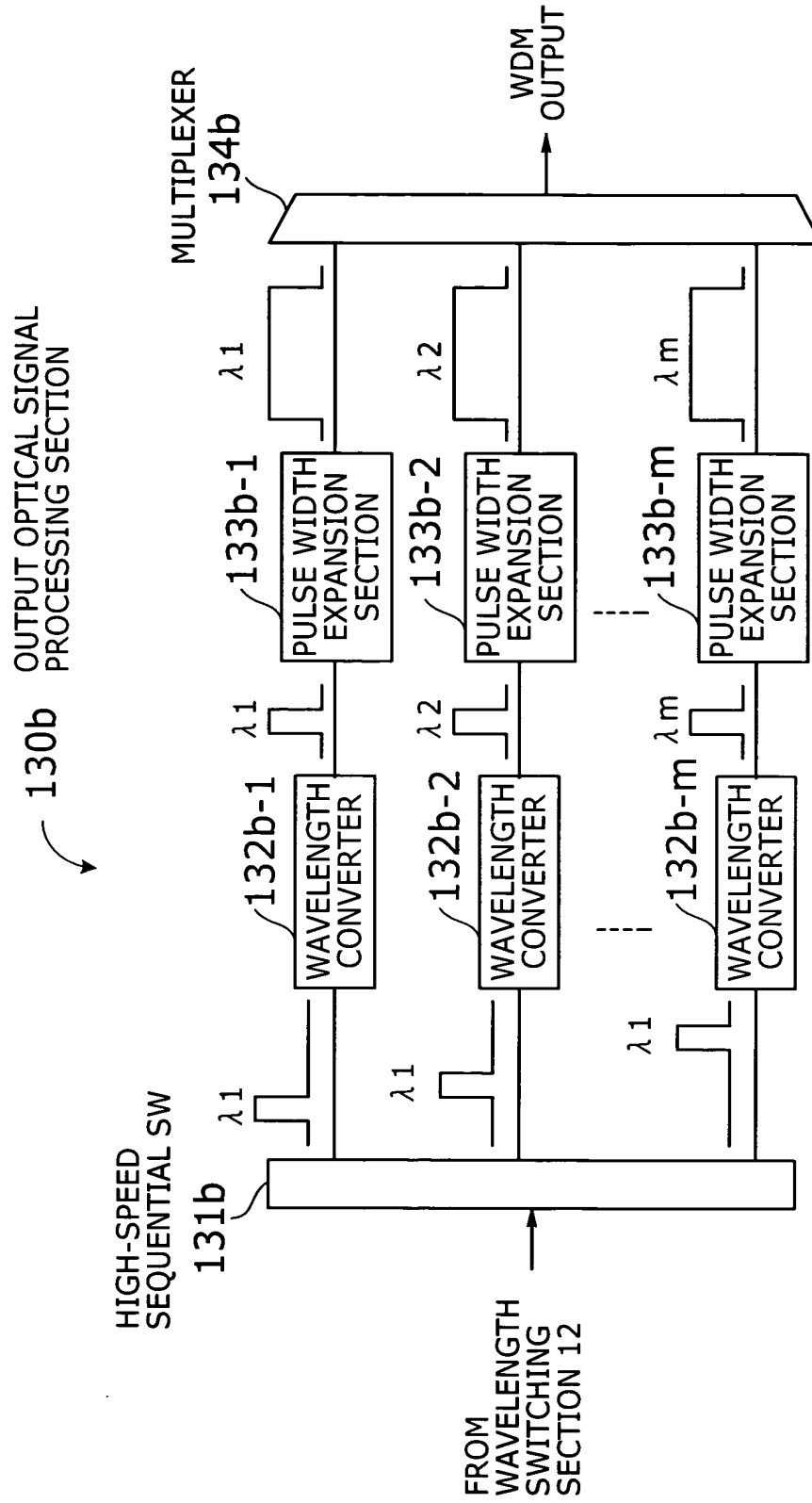


FIG. 18

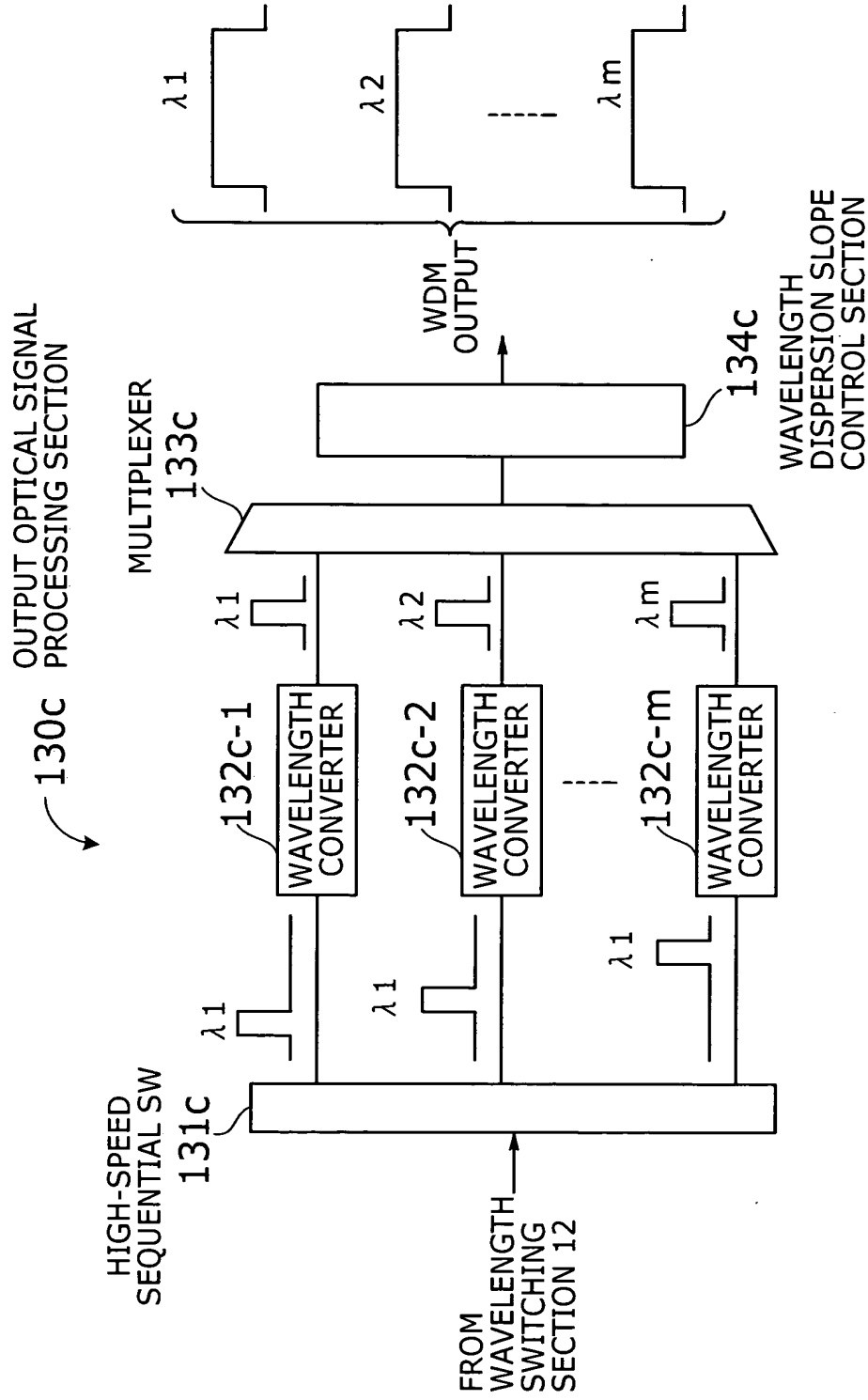


FIG. 19

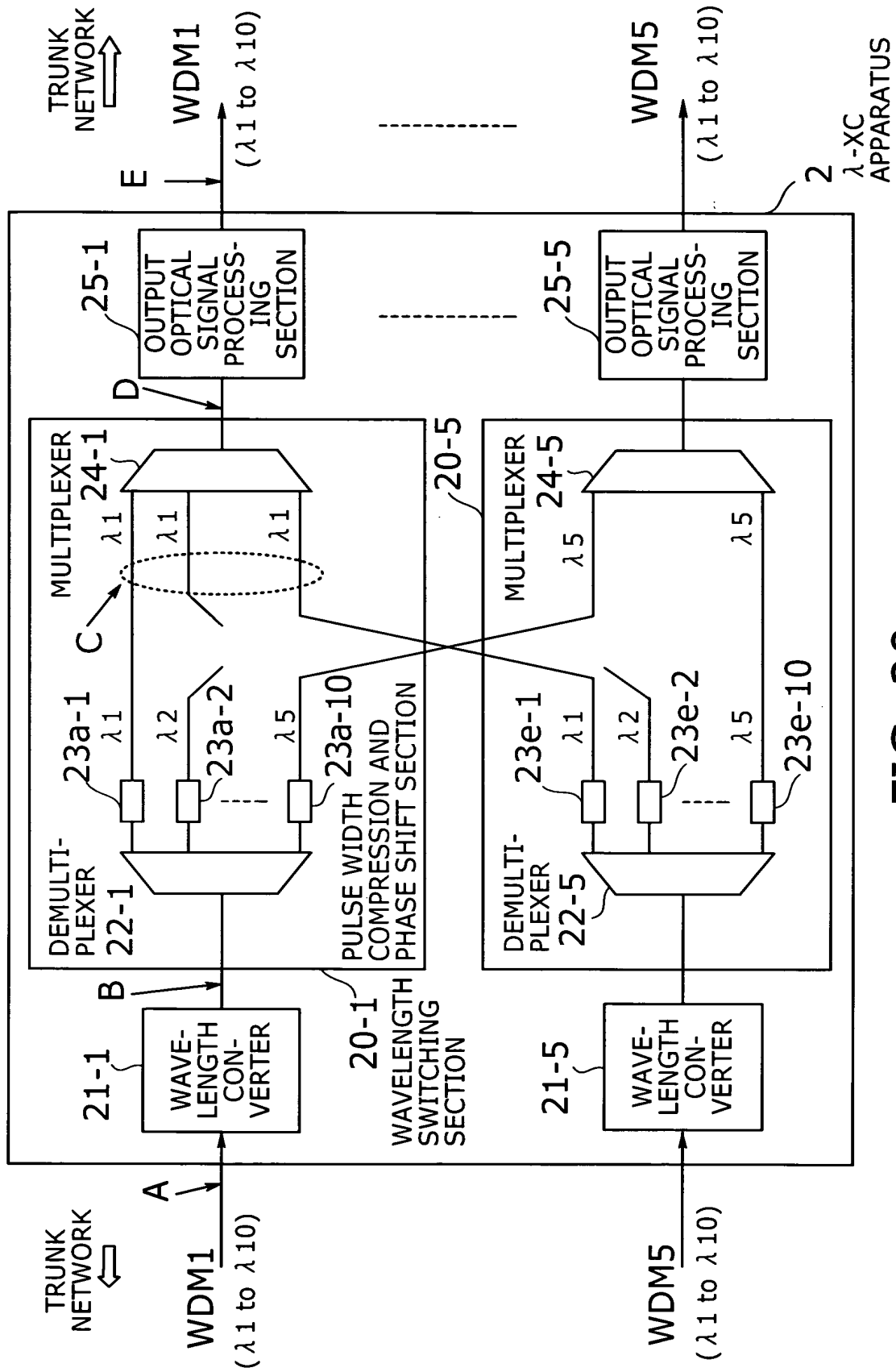


FIG. 20

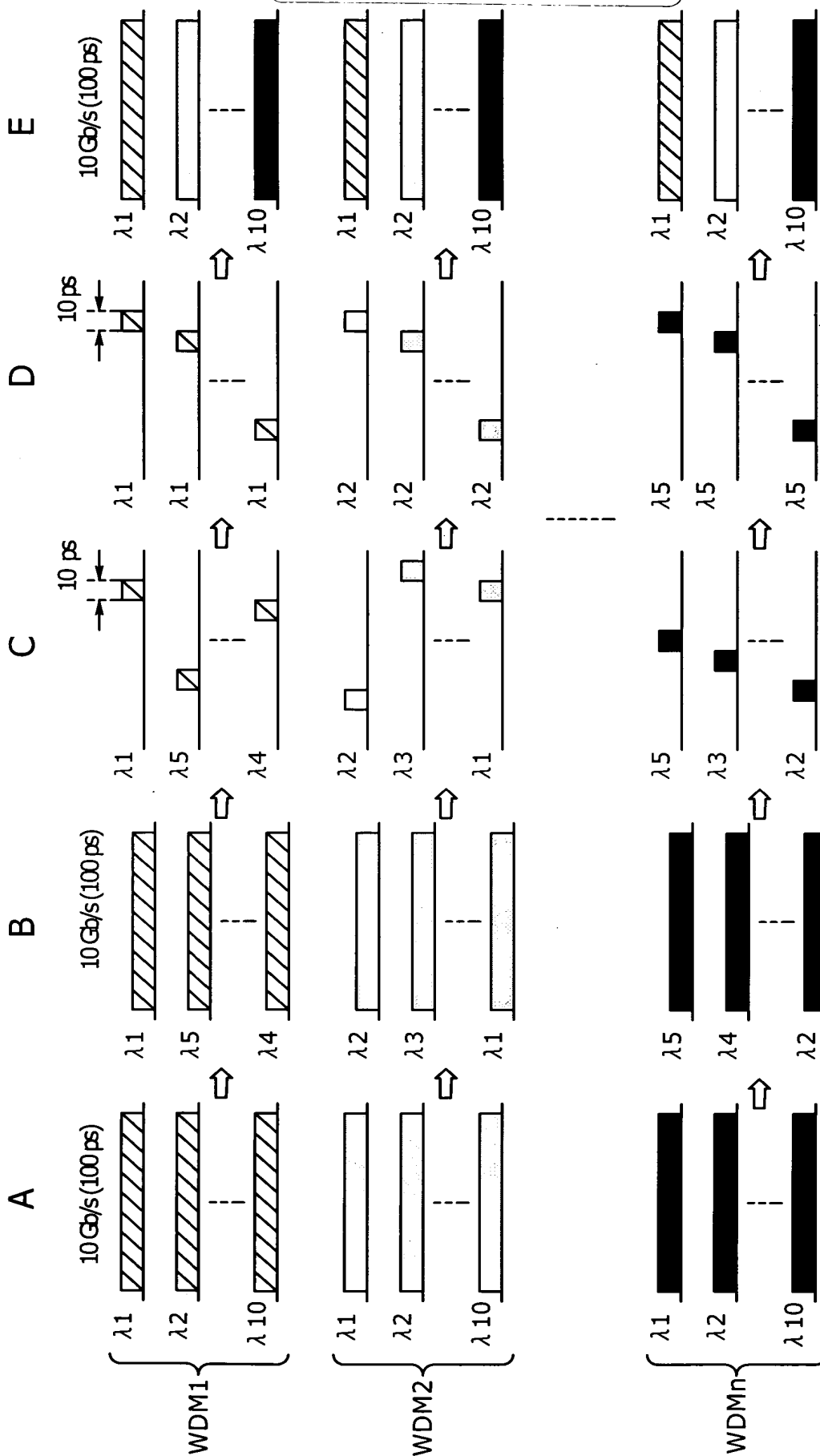


FIG. 21

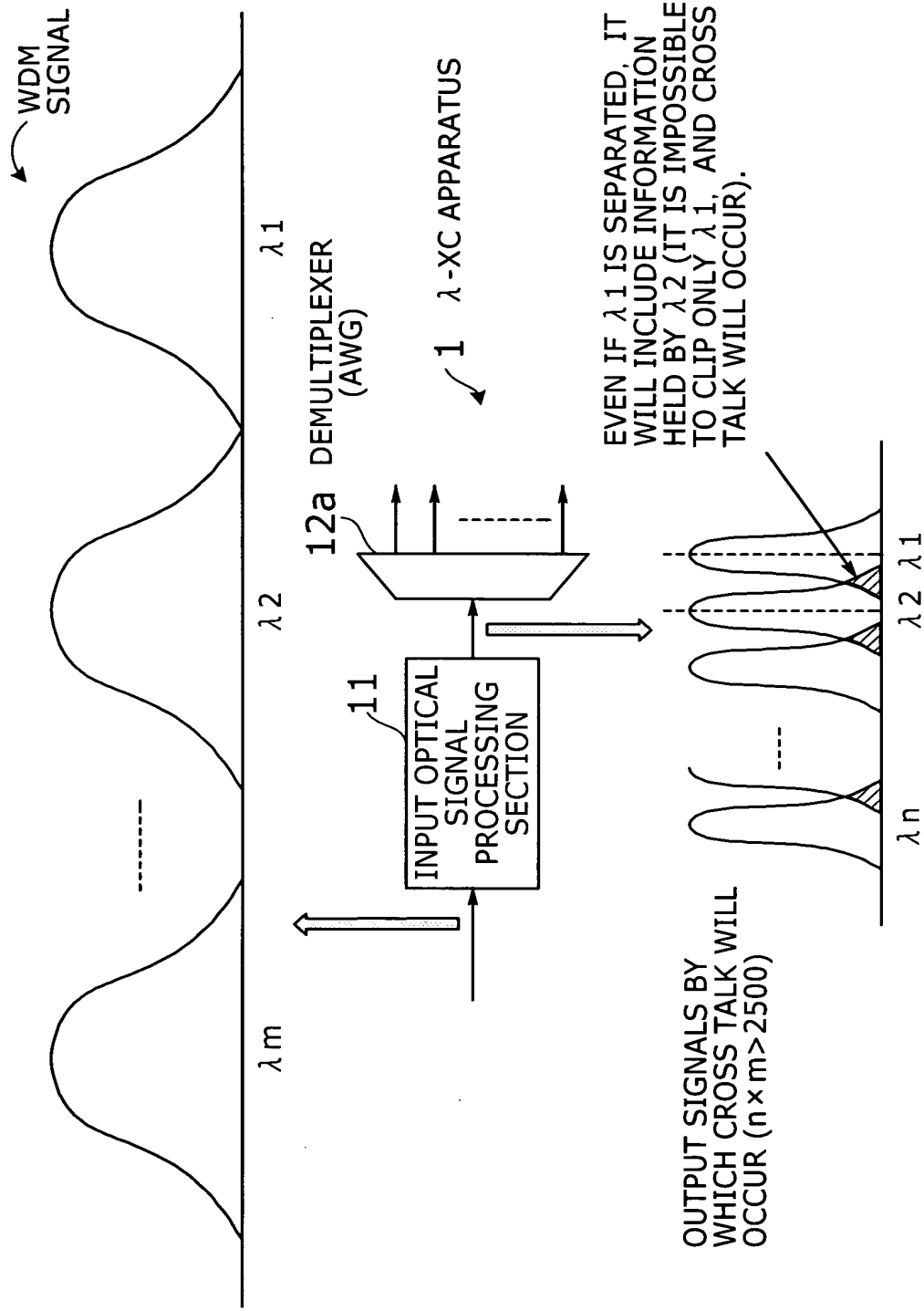


FIG. 22

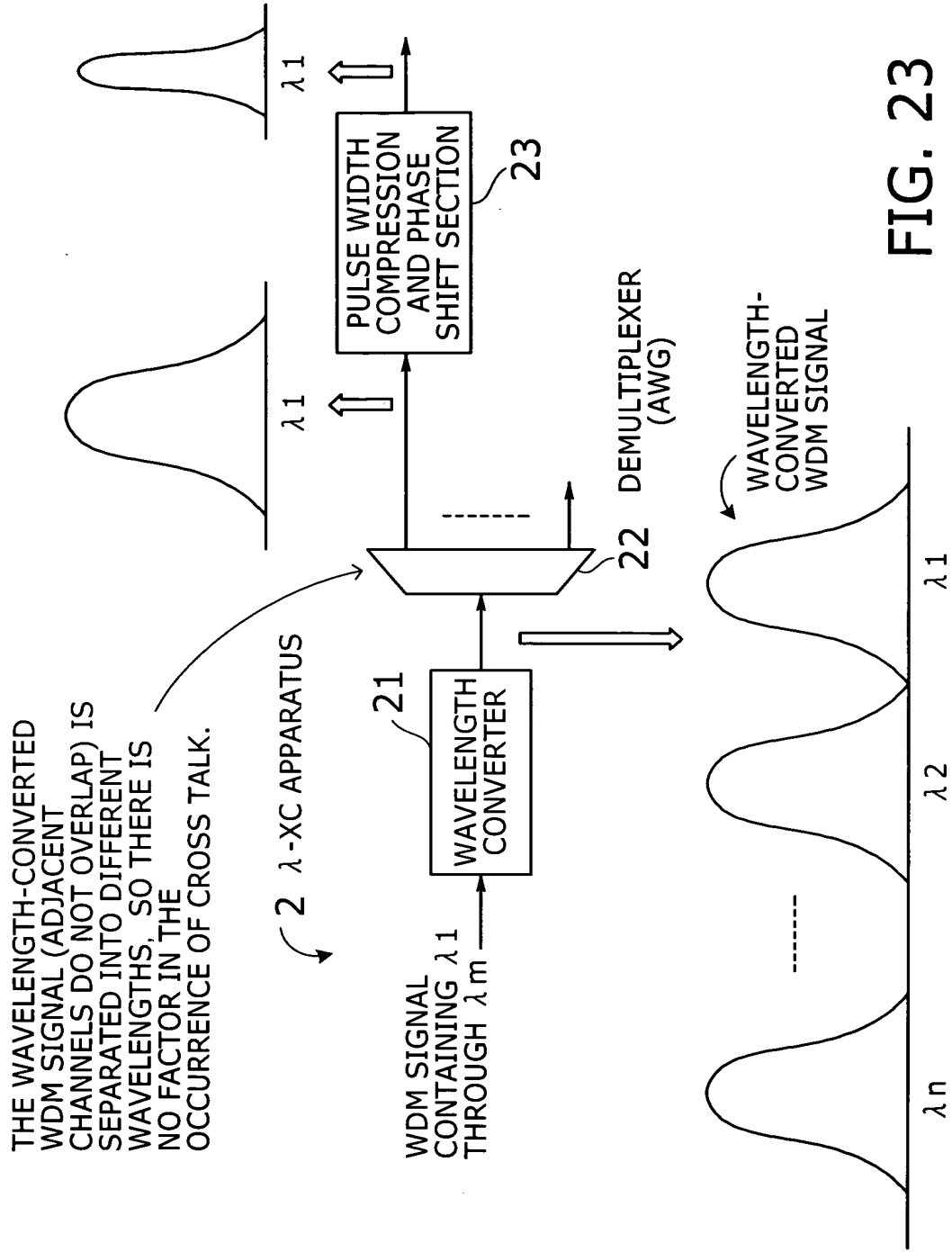
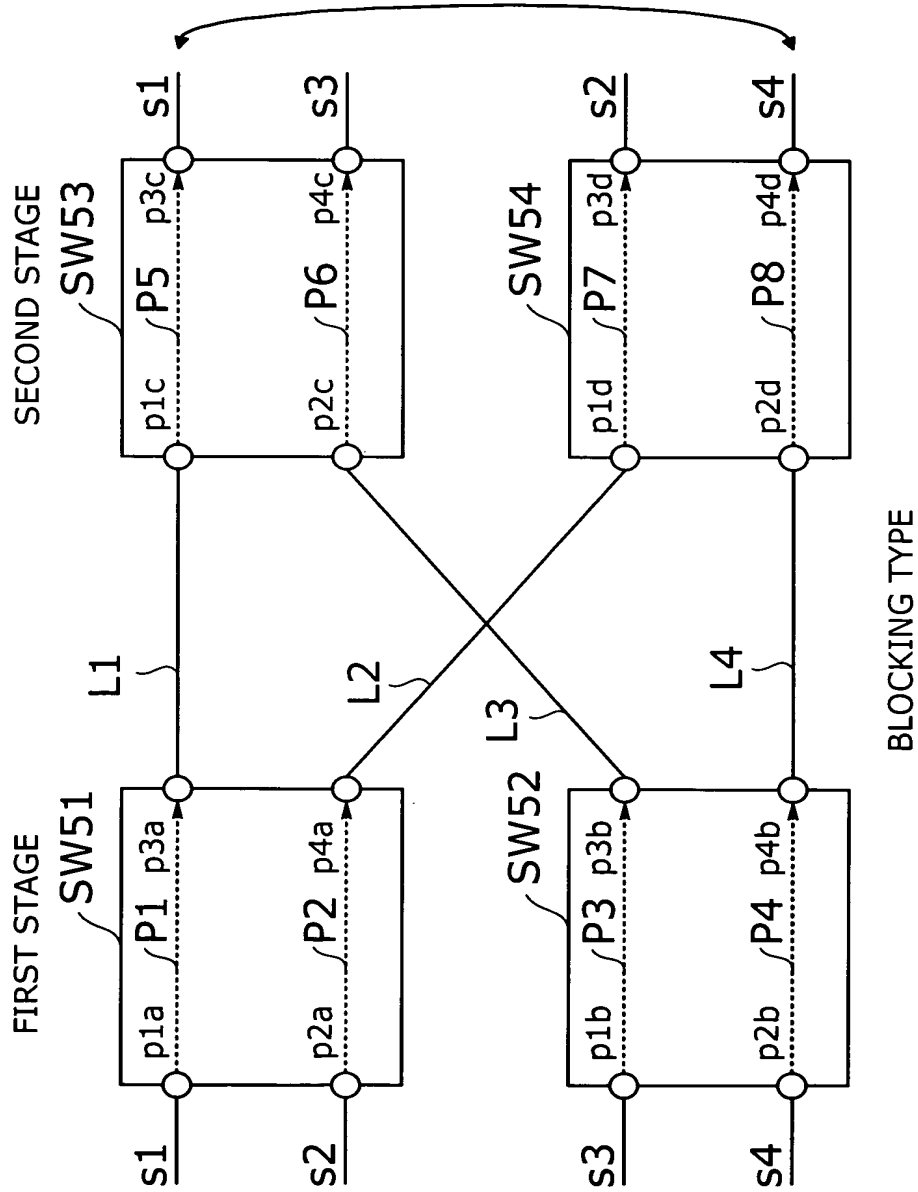


FIG. 23

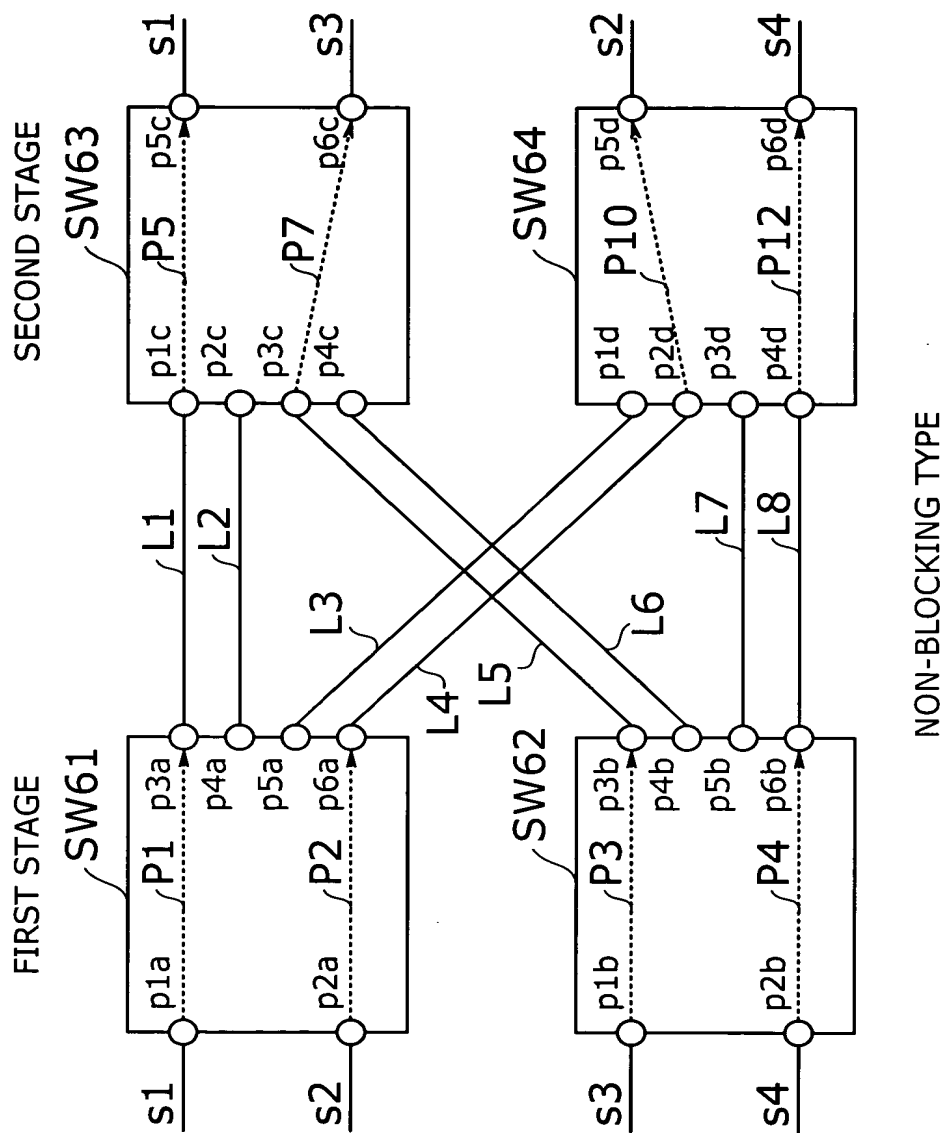
WHEN OUTGOING LINES CORRESPONDING TO (m-1) INCOMING LINES HAVE BEEN ESTABLISHED IN AN m.TIMES.m SWITCH, THE DESTINATION OF THE REMAINING PATH IN A SWITCH WILL BE DETERMINED.



IT IS IMPOSSIBLE TO  
CHANGE ONLY THE  
ORDER IN WHICH THE  
SIGNALS s1 AND s4  
ARE OUTPUTTED.

**FIG. 24**





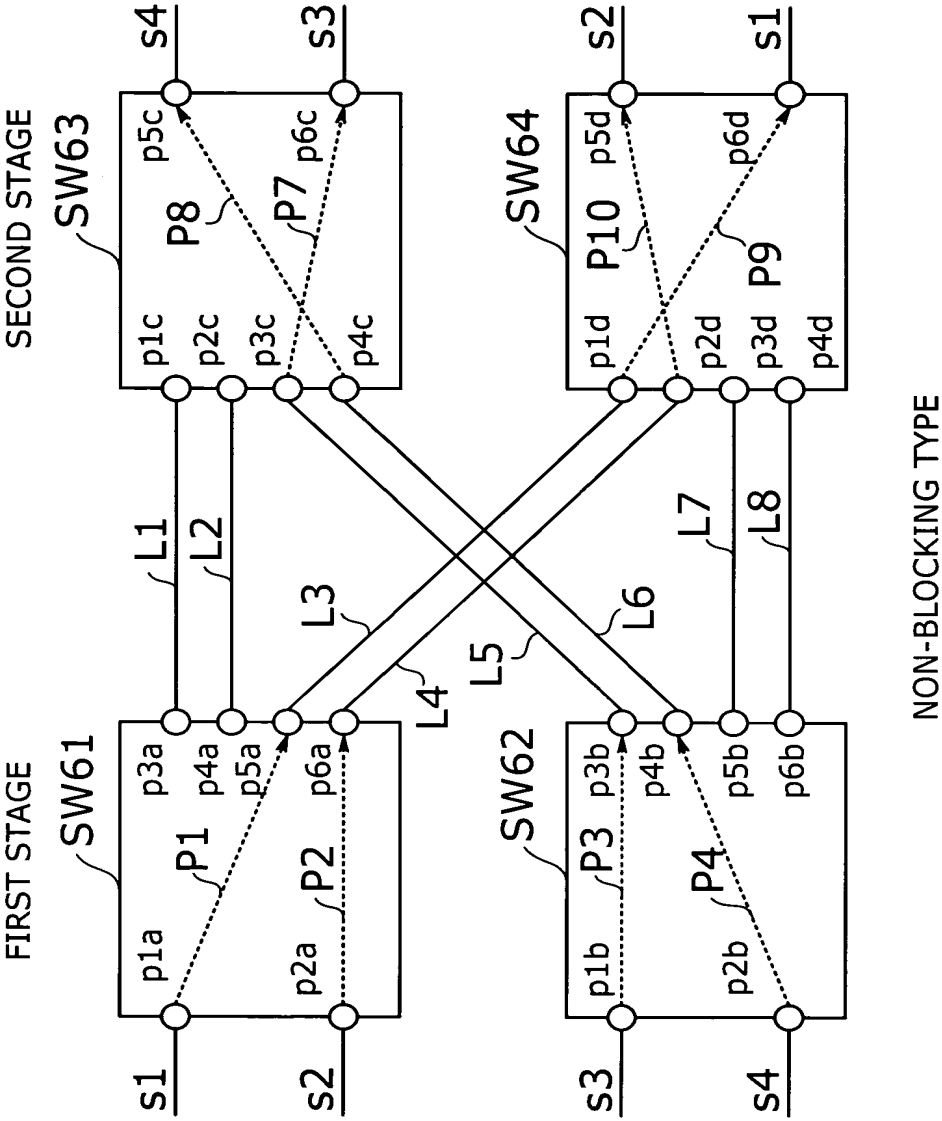


FIG. 26

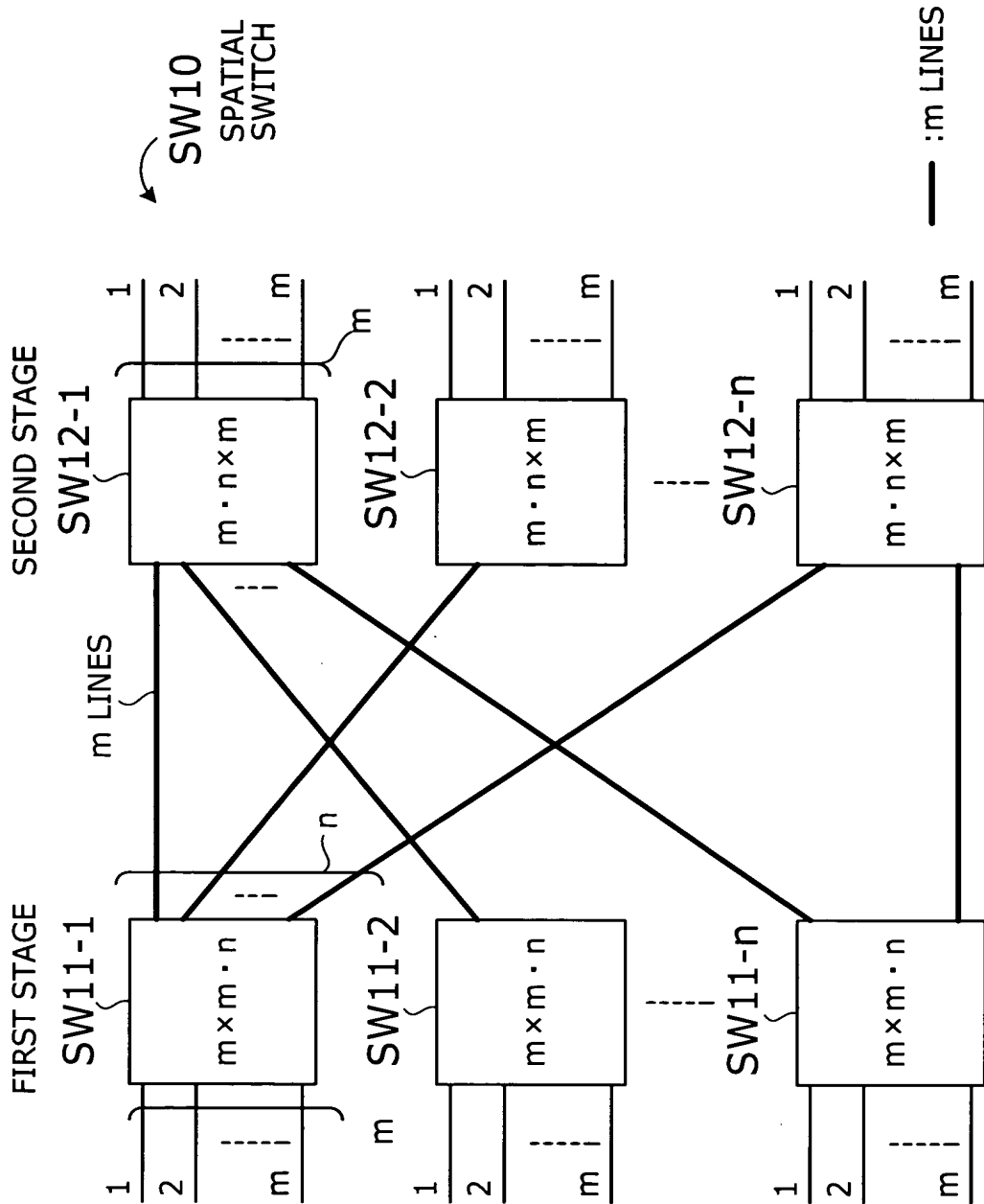


FIG. 27

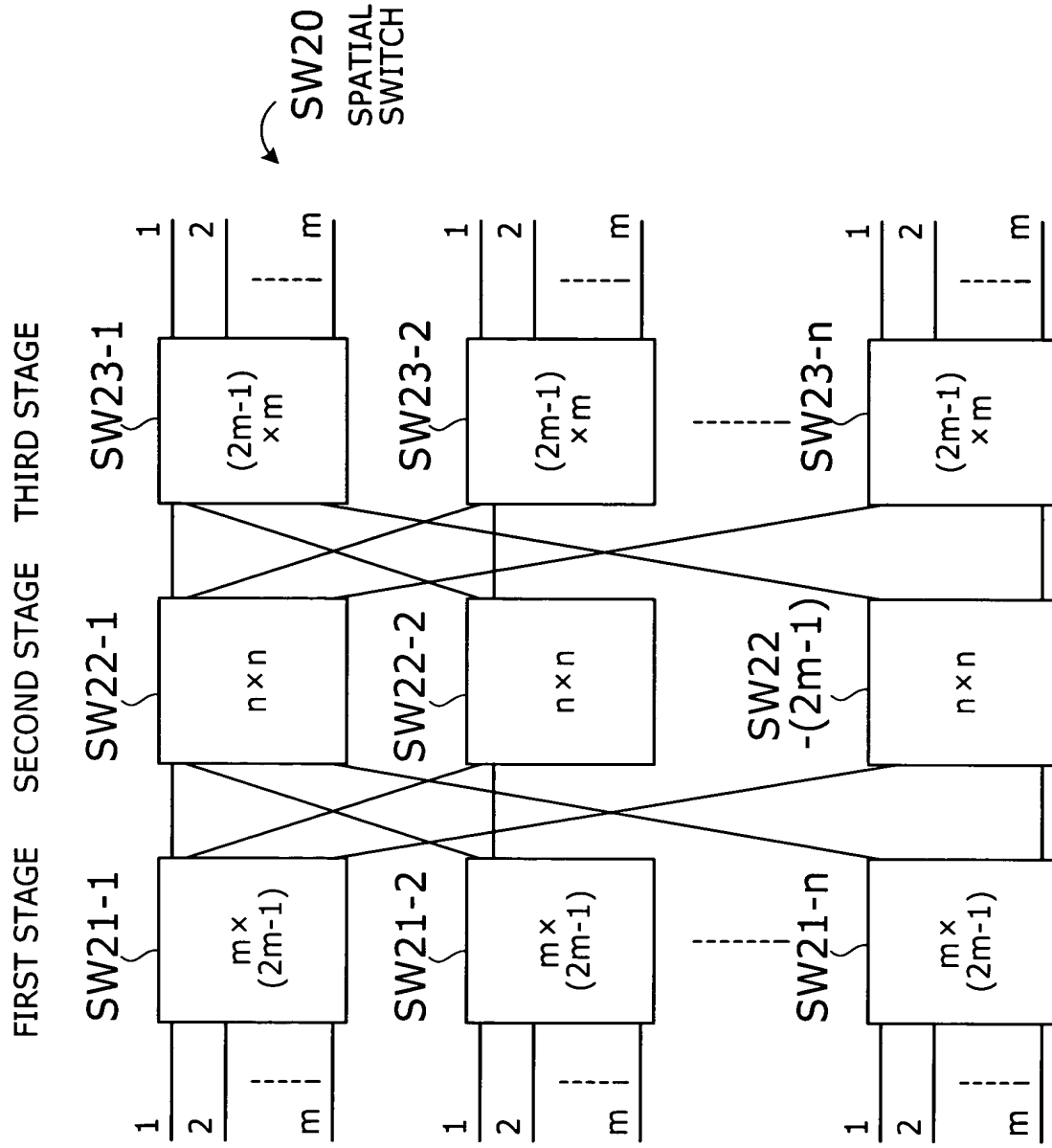


FIG. 28

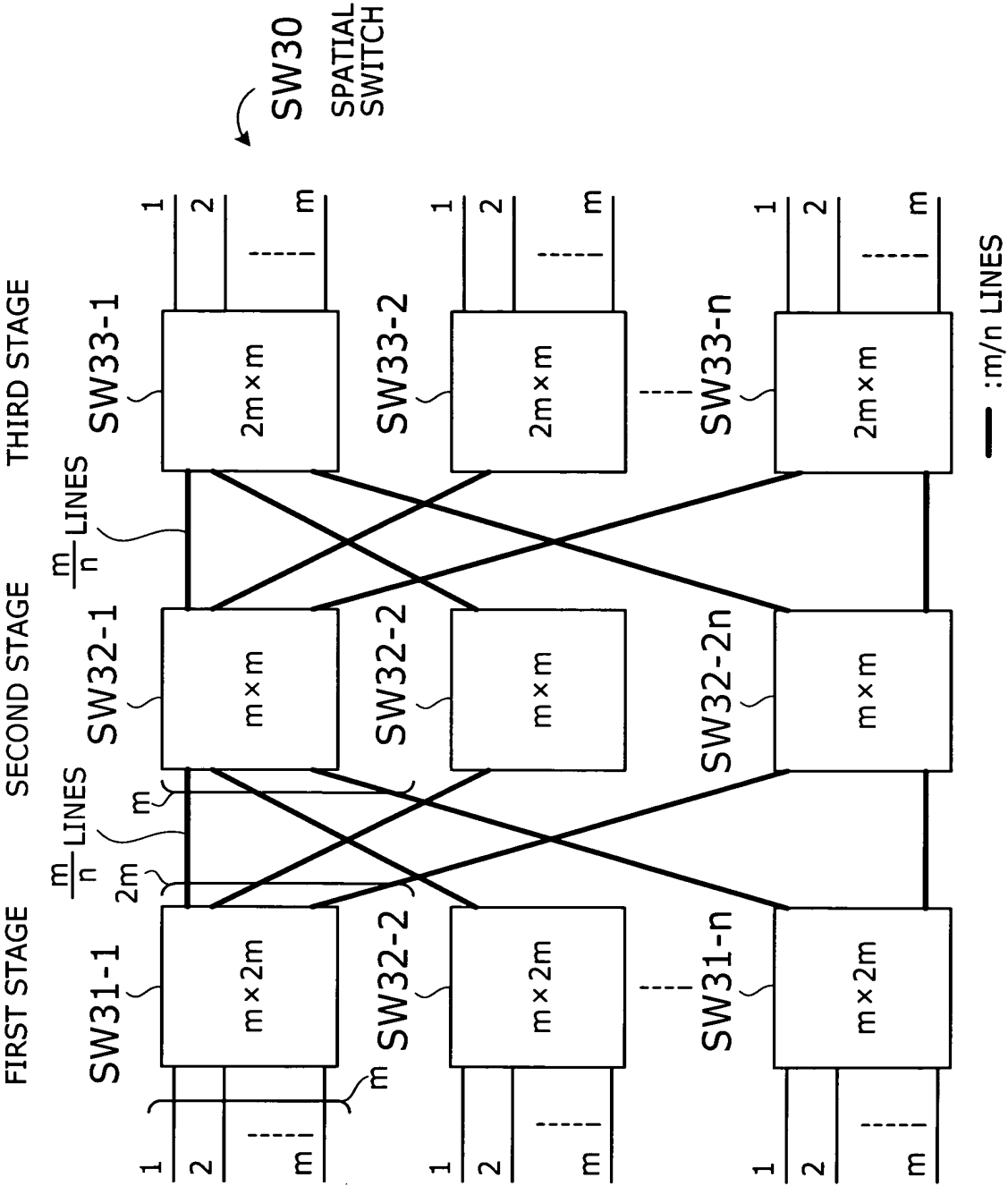


FIG. 29

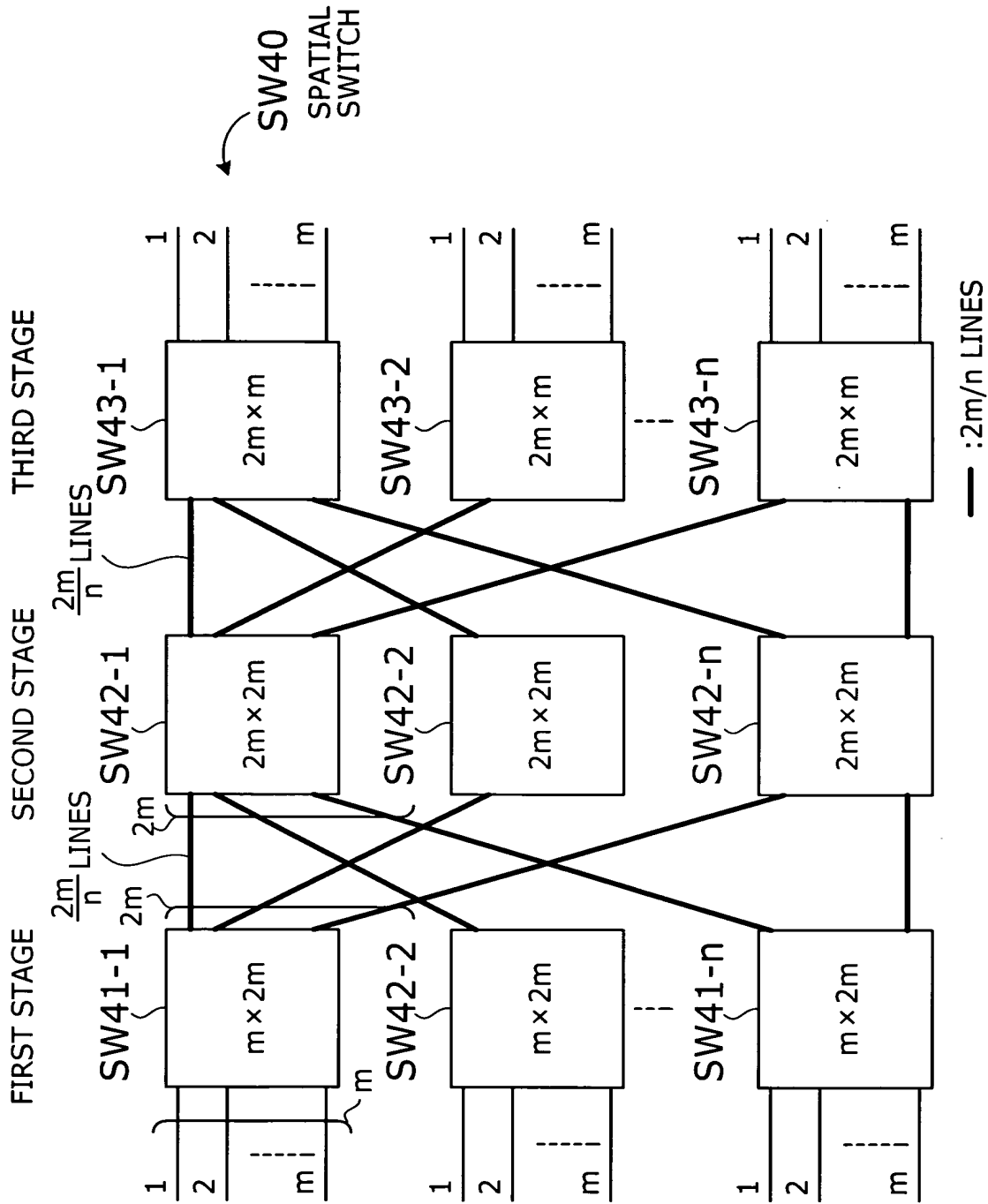


FIG. 30

3  $\lambda$ -XC APPARATUS

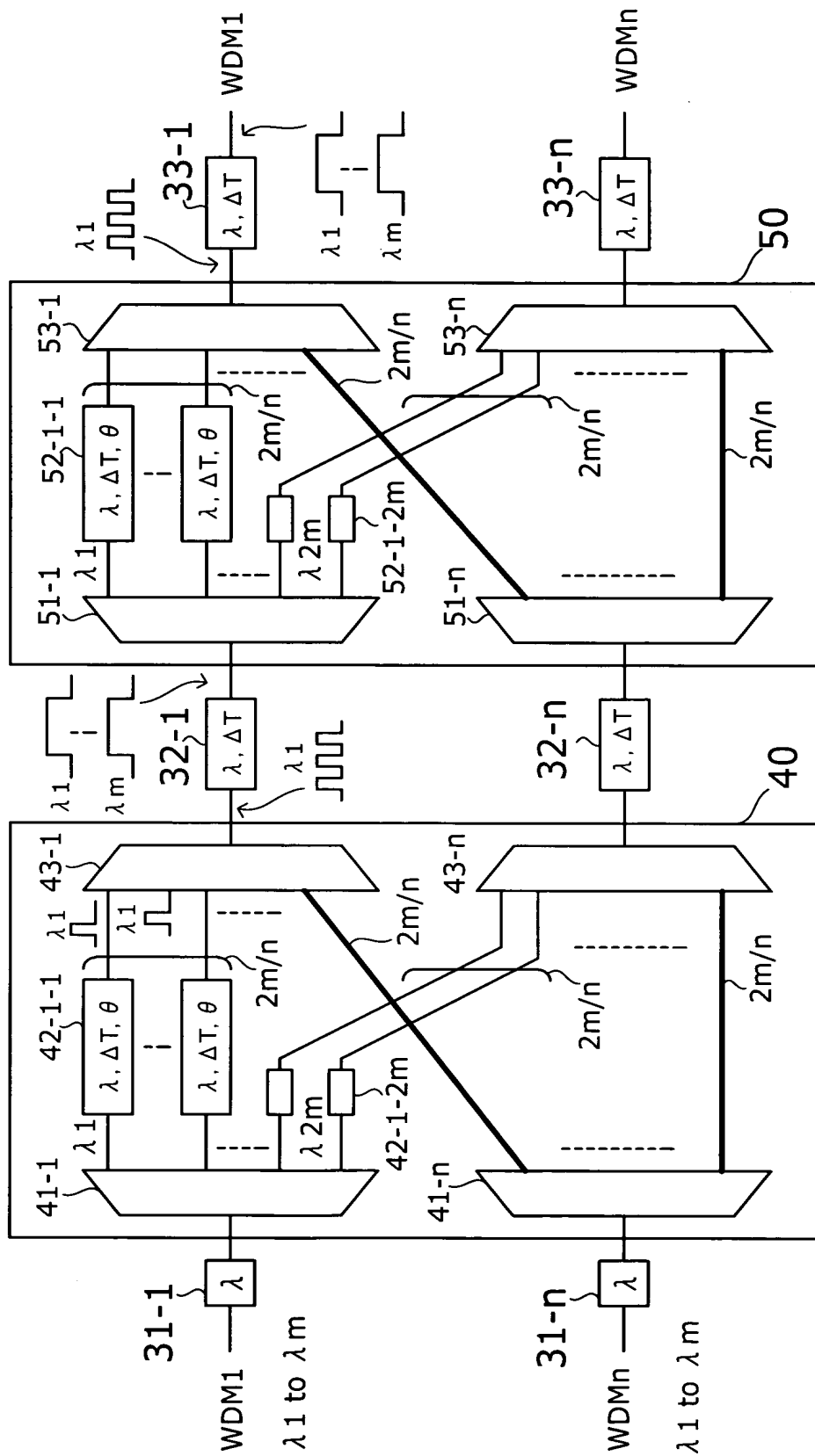


FIG. 31

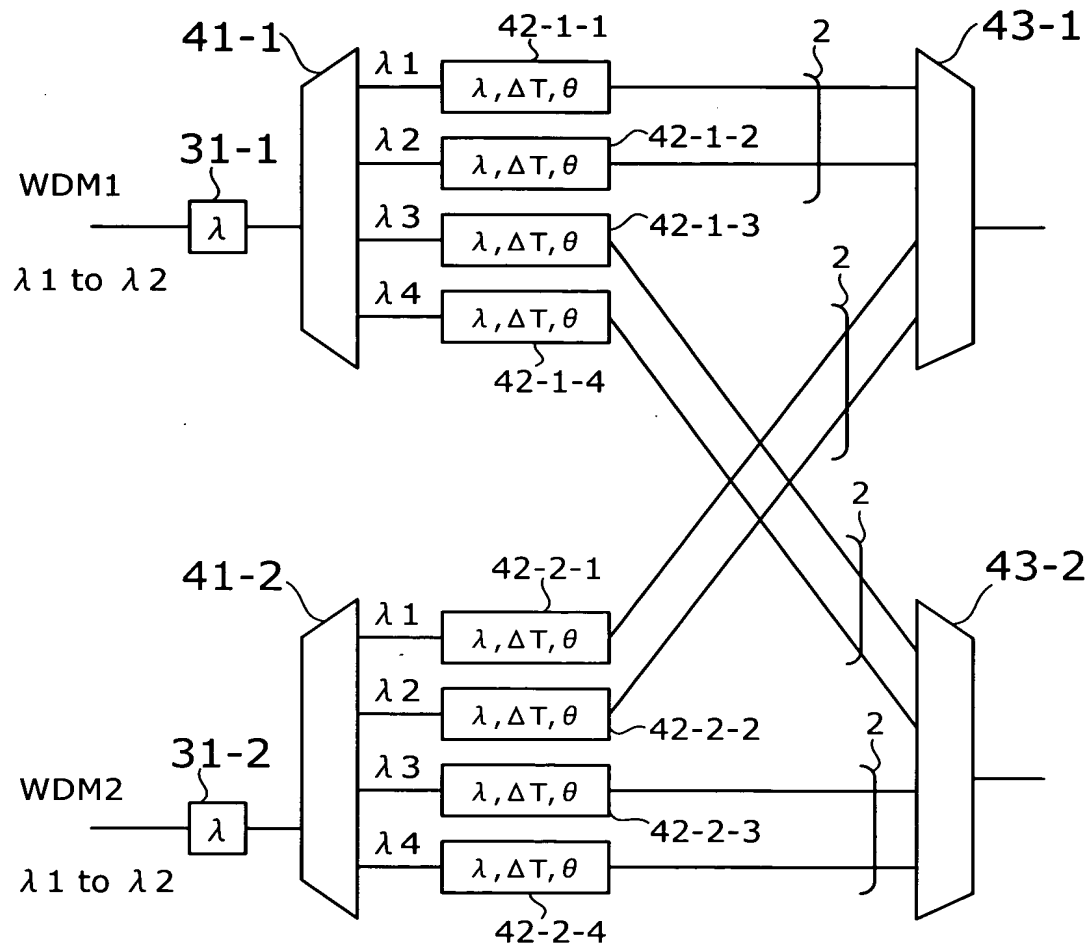


FIG. 32



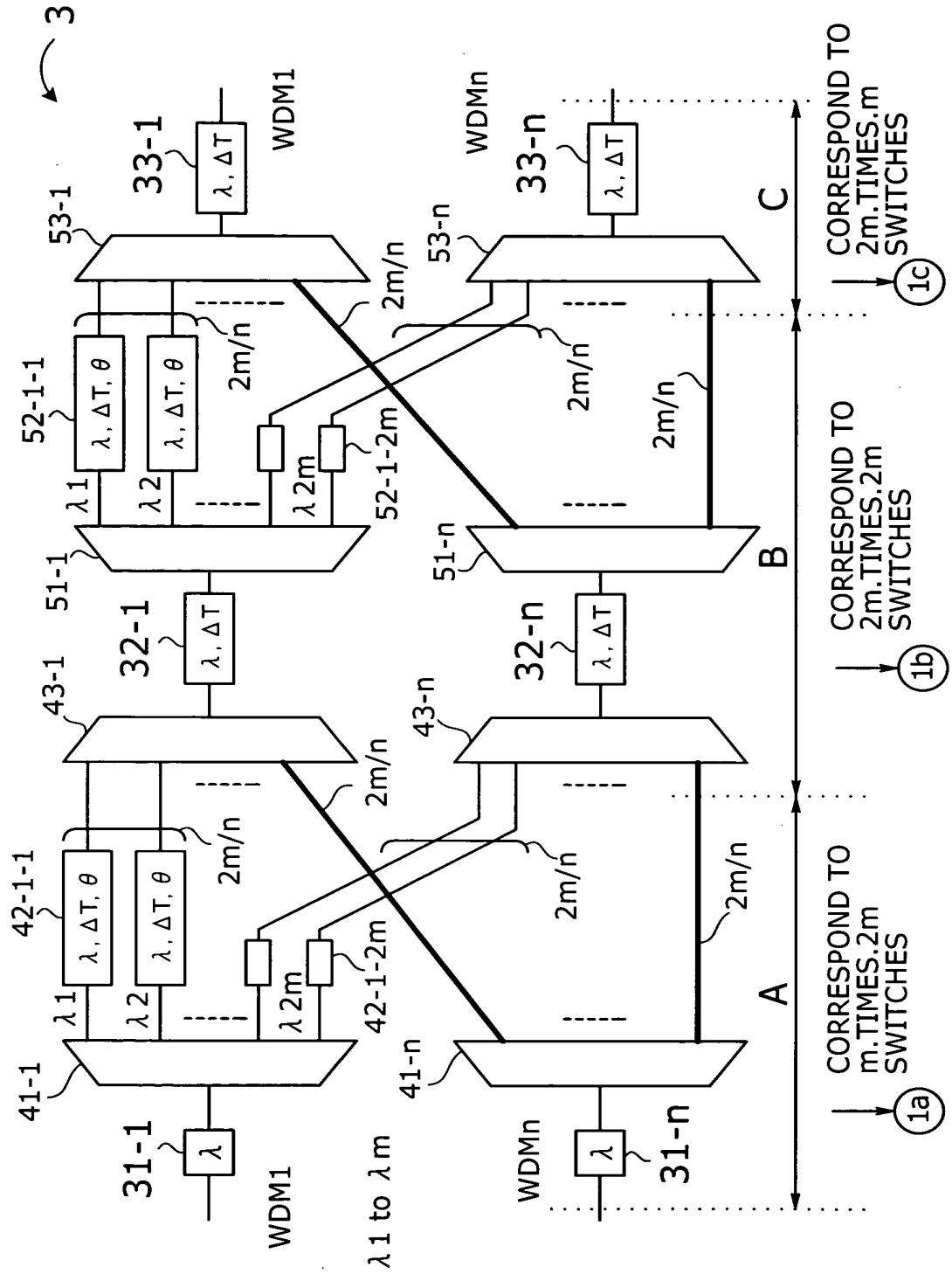


FIG. 33

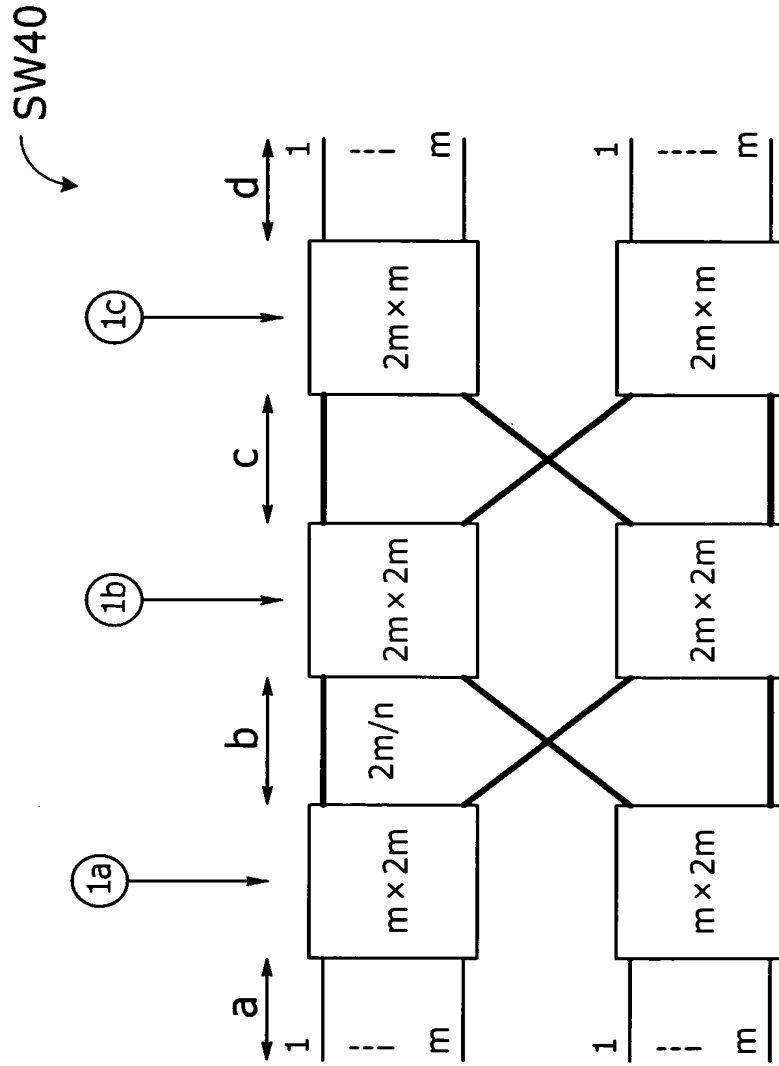


FIG. 34

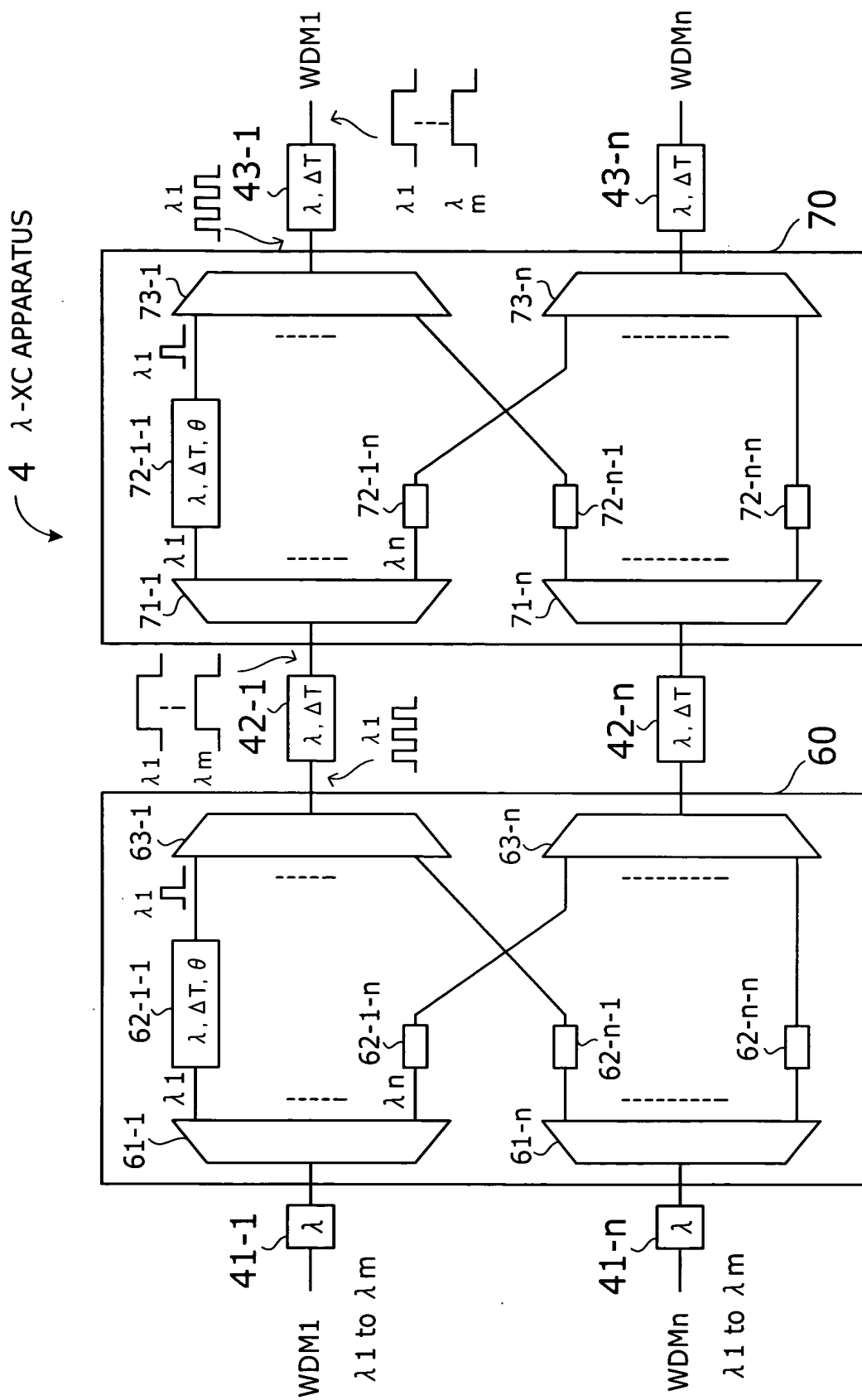


FIG. 35

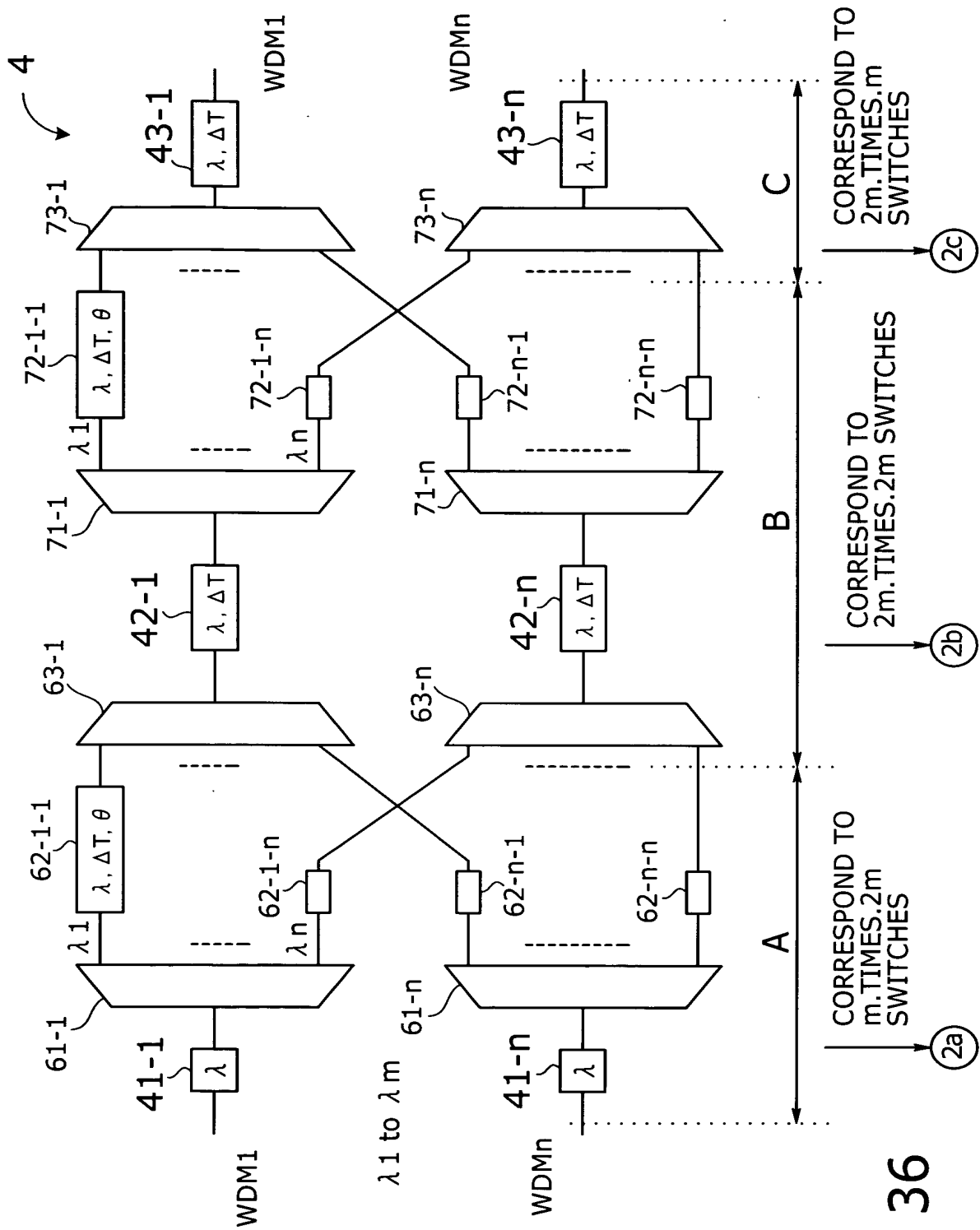


FIG. 36

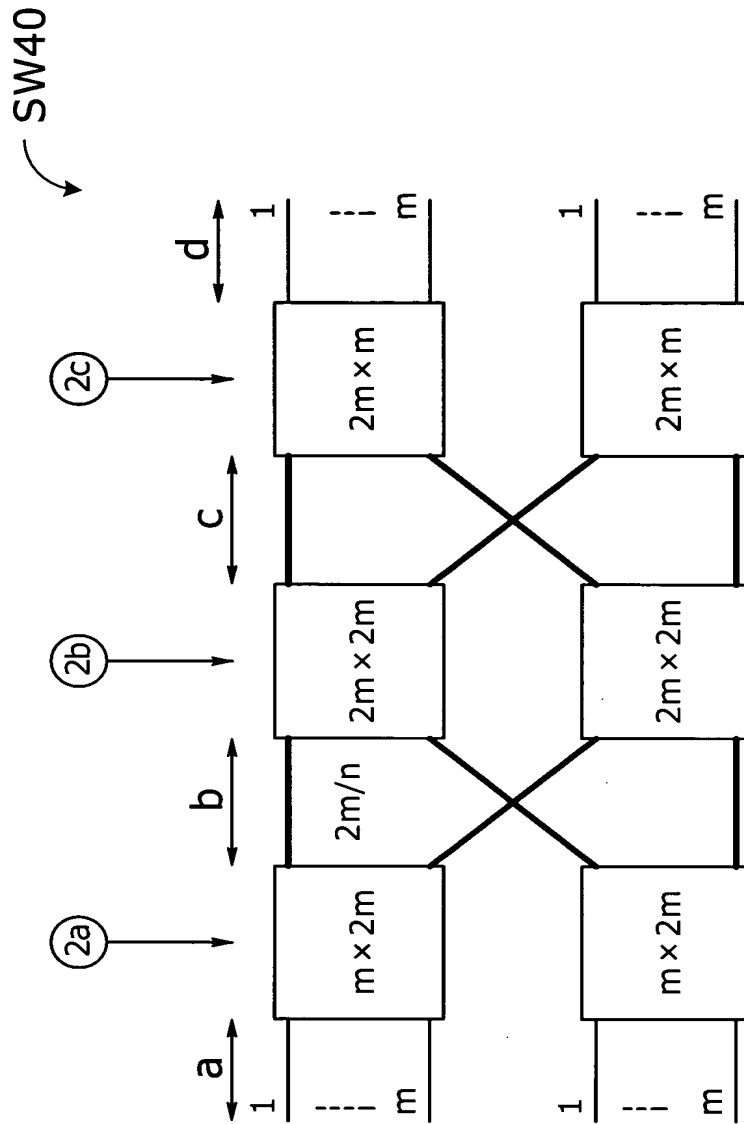


FIG. 37

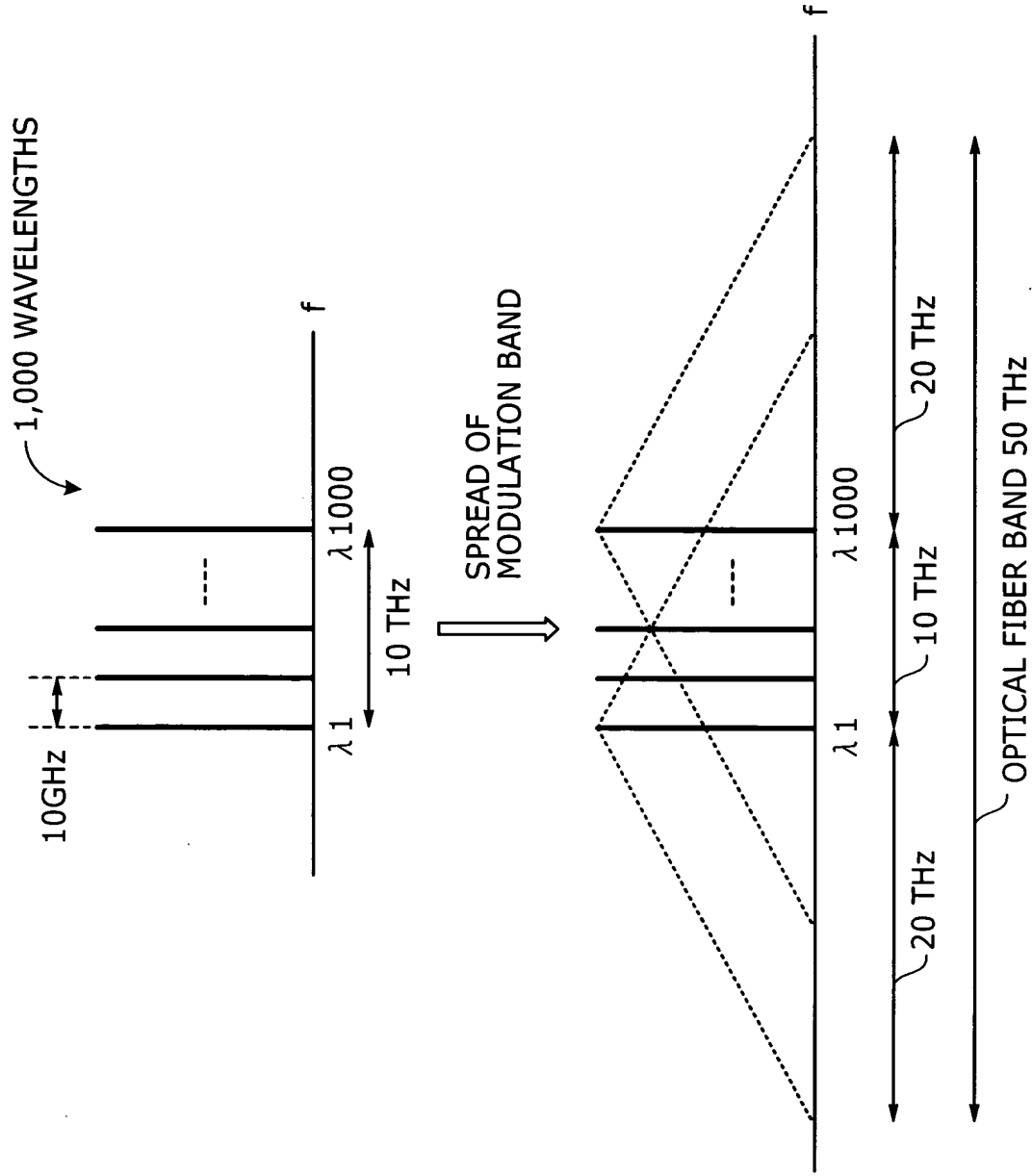


FIG. 38